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H. BROOKES

ASSISTANT EDITOR

1

[New process for production of flexible vacuum packs and low-internal-pressure inert gas packs.] Neues Verfahren zur Herstellung von flexiblen Vakuumverpackungen und Schutzgaspackungen mit Unterdruck.
Buchner, N.
Verpackungs-Rundschau **26** (5) 728, 730, 732, 734-735 (1975) [4 ref. De, en, fr]

The development of the 'Variovac' process for vacuum or inert gas packaging of foods on a vertically-operating form-fill-seal machine is described, with reference to the importance of evacuation rate. The process is based on displacement of O_2 by flushing with inert gas, which may then be fully or partially removed by evacuation before sealing of the pack. Practical trials with ground coffee are briefly described, with special reference to the dependence of machine throughput, efficiency of O_2 removal and residual vacuum on filling wt., filling height and the fineness of grinding of the coffee. It is concluded that very finely-ground coffee requires packaging in an inert gas atm.; less finely-ground coffee requires only vacuum packaging. Advantages claimed for the Variovac process are discussed. IN

2

[Process for decaffeinizing raw coffee.] Verfahren zur Entcoffeinierung von Rohkaffee.
Vitzhum, O.; Hubert, P.; Sirtl, W. (Hag AG)
German Federal Republic Patent Application 2 357 590 (1975) [De]

Liquid CO_2 is used to selectively remove caffeine from an aqueous raw coffee extract solution. The solution undergoes liquid/liquid extraction with the liquid CO_2 at a temp. of 28-30°C, i.e. just below the critical temp. and a pressure of some 58-73.4 atm. The caffeine which has dissolved in the CO_2 is removed on a suitable sorbent. W&Co

3

Instant beverage tablets.
Schoonman, M. L.
United States Patent 3 892 867 (1975) [En]

Pressed, powdered, disc-like wafers of coffee or tea are packaged together with similar wafers of dried milk and sugar in a manner such that selected wafers may be separated and added to water to form the desired beverage mixture. IFT

4

Effect of ethrel on ascorbic acid of coffee fruits.
Gopal, N. H.; Vasudeva, N.
Current Science **44** (11) 397 (1975) [8 ref. En]
[Div. of Plant Physiology, Central Coffee Res. Inst., Coffee Res. Sta. - 577117, Chikmagalur District, Karnataka, India]

9 plants of coffee arabica L. were each sprayed when fruit were in the mature green condition with 750 ml aqueous solution containing 0.5 ml ethrel. Compared with unsprayed controls, ascorbic acid content (mg/100 g fresh wt.) of the fruit wall was significantly lower (1.72 vs. 6.02), of the mucilage significantly higher (1.11 vs. 0.58) and of the seeds about 9% higher (49.02 vs. 45.15; not significant) in experimental plants. AL

5

Growing popularity of decaffeinated coffee creating interest in finding a better method to extract caffeine.
Lee, S.
Tea and Coffee Trade Journal **147** (6) 8-12 (1975) [En]

Improvements in producing decaffeinated coffee beans are briefly outlined. Thoroughly steamed green beans became porous, allowing solvent extraction of free caffeine (by chlorinated hydrocarbons, e.g. trichlor ethane) as well as its liberation from a chlorogenic acid compound. Moisture from steamed beans can be removed in a continuous process by the Wyssmont Turbo Dryer, a modernized tray drier. Wet material can be fed continuously to a series of trays rotating in a hot air chamber, and automatically discharged. RM

6

Getting to know a new plant.
Harris, H. R.
Food Trade Review **45** (7) 15-18 (1975) [En]

A study of the process for manufacturing instant coffee revealed many problems which needed to be solved by the project manager. Aspects considered are: yield problem (means of calculating yield required); system for recording the yield; importance of flow rate; cost saving due to increased yield; and blockage problem - used coffee failing to discharge from the pots. VJG

7

[Food law evaluation of the use of the term 'natural' and associated explanatory phrases in relation to coffee, tea, and tea-like products.] Bemerkungen zur lebensmittelrechtlichen Beurteilung naturbezogener Bezeichnungen und erläuternder Hinweise bei Kaffee, Tee und teeähnlichen Erzeugnissen.
Wurziger, J.
Kaffee und Tee Markt **25** (6) 3-6 (1975) [9 ref. De] [Chem. und Lebensmitteluntersuchungsanstalt, Hygienisches Inst., Hamburg, Federal Republic of Germany]

The Federal German Law 'Gesetz zur Gesamtreform des Lebensmittelrechts' of 15 Aug. 1974 forbids in Section 17 (1) the use in marketing or advertising of food, descriptions implying that foods containing permitted additives or residues or processed by permitted treatment are 'natural', 'nature-pure' or 'free from residues'. Problems arising from the use of various pesticides at different stages of manufacture of coffee, tea and tea-like products are exemplified from the legal viewpoint in regard to such descriptions of production, processing and treatment of the items under discussion, as well as in regard to such descriptions of any of their individual material properties. SKK

8

[Formation of carcinogens during processing of foods.] Entstehen bei der Zubereitung von Lebensmitteln krebserzeugende Stoffe?
Fritz, W.
Ernährungsforschung **20** (2) 49-51 (1975) [De] [Zentralinst. für Ernährung, Potsdam-Rehbrücke, German Democratic Republic]

Studies on formation and accumulation of carcinogens (especially 3,4-benzpyrene and other polycyclic aromatic hydrocarbons) in foods during processing are discussed. Normally-roasted coffee beans contained only 0.3-0.5 µg 3,4-benzpyrene/kg; most this was, however, transferred to the coffee infusion (as a result of the solvent action of caffeine). In coffee substitutes, most of the hydrocarbons remained in the grounds. No significant increase in the benzpyrene content of bread or bakery products during baking was observed. The concn. of carcinogens in frying oils decreased with repeated usage. Direct contact with combustion gases during roasting increased the benzpyrene concn. in coffee beans by a factor of 50. Direct drying of grain with combustion gases and traditional methods for smoking of foods resulted in accumulation of small, variable carcinogen concn. in the foods. Smoke generated by the friction method or the steam-smoking method contained very low concn. of benzpyrene. The carcinogen concn. resulting from roasting, baking and frying are too low to present any health hazard. IN

9

Coffee percolator packages and method.
Jones, G. V.; Pereira, J. A.; Rehman, W. C. (General Foods Corp.)
United States Patent 3 888 999 (1975) [En]

An annular shaped percolator package comprises a compressed annular shaped coffee tablet enclosed within a heat-sealed filter material. IFT

10

Percolator packages and process therefore.
Cante, C. J.; Frost, J. R. (General Foods Corp.)
United States Patent 3 889 000 (1975) [En]

The coffee in a coffee percolator package contains sufficient linear organosiliconoxide polymer to reduce the incidence of superheating on brewing. IFT

11

[Use of a combined sensory test for the numerical evaluation of the quality of roasted coffee.]
Orsi, F.
Elelmiszervizsgalati Közlemenyek **21** (1/2) 25-28 (1975) [Hu, ru, de, en, fr] [Tech. Univ., Budapest, Hungary]

Liquid coffee prepared from 2 different samples of roasted coffee beans was offered to members of a panel as a ternary test. When the 2 coffee types had been distinguished, 4 characteristics of coffee (flavour, acidic taste effect, bitter taste effect and total sensation effect) were qualified by the panel, using 1-5 scores. The score-based evaluation combined with the ternary test produced data for checking the efficiency and evaluation capability of panel members or of member candidates, reduced the scatter of results by eliminating data of members giving incorrect scores and served as a basis for performing discriminance analysis. IF

12

There is a safer substitute for trichloroethylene in coffee.
Lee, S.
Tea and Coffee Trade Journal **147** (8) 6, 12 (1975) [En]

The use of trichloroethylene for production of decaffeinated coffee is discussed. Up to 10 ppm is permitted by the US FDA in instant coffee and 25 ppm in ground roasted decaffeinated coffee. At these levels it is not detected by the average consumer, and is not likely to be harmful. It is used for removing 97-98% of the caffeine extracted from green coffee by steaming, and is subsequently recycled. In view of its close relation to vinyl chloride (a potential cause of cancer of the liver), substitution by trichloroethane (methyl chloroform) is recommended. This is an excellent caffeine extractant with a bp of 74°C, permits efficient recovery, and has very low toxicity and no demonstrated carcinogenicity. RM

13

Investigations on BHC residues in drinking water from coffee plantations and coffee beans.
Visweswariah, K.; Jayaram, M.; Venkataramaiah, G. H.
Journal of Coffee Research **3** (4) 96-101 (1973) [6 ref. En] [Cent. Food Tech. Res. Inst., Mysore, India]

Swabbing of stems of coffee plants with 1% BHC insecticide solution to control the stem-borer has been found very effective in India. In view of its wide use on coffee estates, an investigation was made of the possibilities of contamination of coffee beans themselves, of the soil by inevitable drips, and of ponds and rivers (with a risk to drinking water) by leaching out in rain water. The following samples were taken from 5 coffee estates: bark scraped from plant stems, and coffee beans, 55; soil samples below plants at 5, 10, 15, 25 and 45 cm depth, 20; and water samples, 47. Residues of BHC were determined by a standard TLC method. Appreciable amounts (30-65 ppm) of BHC were absorbed on the bark, but none was translocated to the beans and there was no risk of its presence in the beverage. In spite of heavy rainfall residues in soil were small, amounting to 2-10 ppm at <5 cm depth, 3-4 ppm at 5-10 cm and nil at lower depths; this confirmed the known rapid degradation of BHC. The insecticide content of the water supplies ranged from 0.02 to 0.2 ppm and was higher than the levels considered acceptable in some cases; no residues were found in pond or river silt. ELC

14

Studies on ascorbic acid in coffee plants. III. Distribution in pulp and pulp water of ripe fruits.
Gopal, N. H.; Vasudeva, N.
Journal of Coffee Research **4** (4) 121-122 (1974) [6 ref. En] [Div. of Plant Physiol., Cent. Coffee Res. Inst., Coffee Res. Sta. 577117, Chikmagalur District, Karnataka, India]

Results of 2 experiments on detn. of the distribution of ascorbic acid in the mucilage and fruit wall of individual fruits and in the pulp and pulp water of bulked fruits of ripe Arabica coffee (1975) are reported. In the 1st experiment, fully ripe fruits were picked from 6 Arabica coffee plants and the fruit wall was separated from the mucilage. In the 2nd experiment, fruit wall pulp and pulp water containing mucilage were collected during pulping of bulked ripe fruits. The ascorbic acid content was significantly higher in the fruit wall than in the mucilage. Contents were (mg/100 g fresh wt.): 1st experiment, fruit wall 6.77, mucilage 0.60; 2nd experiment, pulp 5.89, pulp water 0.12. [See FSTA (1974) **6** 10H1777 for part I.] ELC

15

Freeze-dried coffee.
Hag AG
British Patent 1 396 734 (1975) [En]

An aqueous coffee extract is foamed by addition of nitrous oxide, argon, or a halogenated fluorinated hydrocarbon; frozen; and the resultant foam is freeze-dried. IFT

16

[Thermal conductivity of freeze-dried foods in bulk.] Die Wärmeleitfähigkeit von Schüttungen gefriergetrockneter Lebensmittel.
Kostaropoulos, A. E.
Lebensmittel-Wissenschaft + Technologie **8** (5) 202-205 (1975) [11 ref. De, en] [Inst. für Lebensmittelverfahrenstech., Univ., Kaiserstrasse 12, D-75 Karlsruhe, Federal Republic of Germany]

This paper on thermal conductivity of freeze-dried foods in bulk [meat, coffee, potatoes] reports on experiments intended to demonstrate the influence of temp., moisture content, porosity, particle size and structure on the thermal conductivity. The results obtained show that, within the ranges studied (temp. -25 to +40°C, moisture content 1.6-7%, porosity (0.552-0.918), the thermal conductivity of bulk food can be defined by simple functions, which are linear if dependent on temp. and moisture content but take a parabolic course if dependent on porosity. AS

17

Nonenzymic browning. XII. Maillard reactions in green coffee beans on storage.
Pokorny, J.; Con, N.-H.; Smidrkalova, E.; Janicek, G.
Zeitschrift für Lebensmittel-Untersuchung und -Forschung **158** (2) 87-92 (1975) [52 ref. En, de] [Dept. of Food Chem., Inst. of Chem. Tech., Prague, Czechoslovakia]

Changes of free amino acids, reducing sugars and brown pigments were studied during storage of green coffee beans at increased temp. to accelerate the browning process (60°C, in a closed container at 51% RH, with water content of the coffee constant at 7.3%). During storage the reducing sugars present in the beans reacted with free amino acids with the formation of colourless unstable products. Additional reducing sugars and free amino acids were produced by hydrolysis of polysaccharides and proteins respectively. Relatively low contents of total amino acids and trace amounts of cystine, methionine and histidine indicated that some Maillard reactions took place even during storage at ambient temp. before the experiment. The 2nd stage of storage was characterized by only slight changes in the content of free amino acids and sugars but by intensive browning reactions. Brown products formed by Maillard reactions were partially soluble in 75% aqueous ethanol; the ratio of absorbances at 400 and 500 nm decreased from 9.5 in the original coffee beans to 5.4 after 80 days of storage. The flavour, colour, and especially odour, of coffee beverage deteriorated during the 2nd stage of storage. Lysine combined in protein was involved in browning reactions via colourless intermediary products. [See FSTA (1975) **7** 12A661 for part XI, and also following abstr.] AL

18

[Econometric study of coffee consumption in some industrialized countries.] In "Chimie des Cafes Verts, Torrefies et leur Derives" [see FSTA (1976) **8** 3H386]. [Lecture]
Tapias, L. F.
pp. 41-46 (1974) [Es] [Univ. Externado de Colombia, Bogota, Colombia]

Coffee consumption in some industrialised countries (USA, Canada, Federal Germany, UK, France, Switzerland, Italy, Austria, Denmark, Sweden, Finland, Belgium, Netherlands, Norway, Spain) was studied in relation to per capita income on the basis of an Engel curve. Econometric models were based on transverse cuts in a chronological series, and also included Greece and Portugal to provide comparisons with non-industrialised countries and lower income levels. Two regression equations are developed, one of them excluding Anglo-Saxon countries where coffee consumption is low due to high tea consumption. The models are intended for guidance of the coffee industries in producing countries by giving precise information on coffee consumption in the countries studied, market trends, markets at or near saturation point and potential new markets. [See **8** 3H386.] ELC

19

Coffee, green: exportable production in specified countries. Average 1966-1967/1970-1971, Annual 1971-1972/1975-1976 (in thousands of bags). United States of America, Foreign Agricultural Service
Tea and Coffee Trade Journal **147** (9) 34 (1975) [En]

World production of exportable green coffee (total harvested production and estimated domestic consumption) is tabulated in '000 of 60-kg bags by continent and individual countries. Totals for 1974-1975 and 1975-1976 are: N. America, 9877 and 9822 (El Salvador, 2670 and 2185); S. America, 28 193 and 22 830 (Brazil, 19 135 and 14 390; Columbia, 7400 and 6850; Ecuador, 925 and 570); Africa, 18 292 and 16 839 (Angola, 2895 and 1894); Asia, 2789 and 2499 (Indonesia, 1925 and 19705); Oceania, 644 and 690; and world total, 59 795 and 52 680. RM

20

[Caffeine determination by gel chromatography.] Coffeinbestimmung durch Gelchromatographie.
Pokorny, S.; Coupek, J.; Tai, P.-T.; Pokorny, J.
Zeitschrift für Lebensmittel-Untersuchung und -Forschung **159** (1) 43-46 (1975) [9 ref. De, en] [Inst. für Makromolekulare Chemie, Akad. der Wissenschaften, Prague, Czechoslovakia]

A few drops of 25% aqueous NH_4OH solution are added to 100-200 ml tea or coffee infusion or cola-type beverages; caffeine is extracted by shaking twice with 30 ml $CHCl_3$; the combined $CHCl_3$ extract is evaporated under reduced pressure; the residue is dissolved in a small quantity of water; the solution is extracted with 50 ml $CHCl_3$; the solvent is removed as before, and the residue taken up in 1 ml tetrahydrofuran is chromatographed. A system of 5 stainless steel columns 5 × 1200 mm filled with styrene-divinylbenzene copolymer S-Gel-832 (product of the authors' Institute) is used; 0.3-0.4 ml of the tetrahydrofuran solution, diluted to contain approx. 5 mg caffein/ml, are placed on the 1st column; tetrahydrofuran is used as eluant. Determination is by differential refractometer coupled with a UV flow spectrometer working at 254 nm. Values obtained by this method in comparison with the method of Navellier et al. [FSTA (1971) 3 5H800] are tabulated for 10 different tea infusions, 2 of mate, 3 of coffee, 5 of decaffeinized coffee and 13 of cola-type beverages. The results for tea and coffee were on average 0.2% lower for the gel method than for the reference method. For cola-type beverages, they were 22% lower on average, and were even more different for decaffeinized products. The difference is ascribed to entrainment of impurities in the reference method. SKK

21

[6th International Colloquium on the Chemistry of Coffee, Bogota, 4-9 June, 1973.] Sixieme Colloque International sur la Chimie des Cafes Verts, Torrefies et leurs Derives, Bogota, 4-9 Juin 1973. [Conference proceedings]
Quijano Rico, M. (Association Scientifique Internationale du Cafe [ASIC]) (Editor)
358pp. (1974) [many ref. Fr, En, Es, De] 75017, Paris, France

Papers presented at the ASIC International Colloquium on Coffee Chemistry, held in Bogota on 4-9 June, 1973, included: Recent reports on the chemistry and technology of coffee: a review, by R. F. Smith (pp. 18-27, 220 ref., En, fr, es, de); Ten years ASIC work on the chemistry of coffee: results and hopes, by P. Navellier & F. Chassevent (pp. 28-33, 63 ref., Fr, es, en, de); Progress in agronomical research in coffee growing; future views, by R. Coste (pp. 34-40, Fr, es, en, de); Combined gas chromatography-high resolution mass spectrometry for identification and structure elucidation of organic compounds in natural product research, by J. Roboz (pp. 81-88, 11 ref., En, fr, es, de); Production of fungi imperfecti from waste waters from coffee fruit processing plants, by C. Rolz, H. Mayorga, S. Schneider, L. Cordero, J. F. Menchu & R. Espinosa (pp. 260-265, 270, 267, 15 ref., Es, fr, en, de); and Opinions about coffee among doctors and laymen in Eastern Switzerland, by S. Heyden & M. Escher (pp. 304-307, En). A further 33 papers are abstracted separately and are in FSTA in the author index under ASIC [Symposium]. [See FSTA (1973) 5 9H1391, 9H1392, 9H1393, 9H1394 and 9H1395 for the 5th Colloquium.] AL

22

Determination of lead in 'instant' coffee and tea powders by carbon filament atomic absorption spectrometry.
Kapur, J. K.; West, T. S.
Analytica Chimica Acta **73** (1) 180-184 (1974) [7 ref. En] [Chem. Dep., Imperial Coll., London SW7 2AY, UK]

The conventional dithizone or AAS methods for detn. of Pb in coffee or tea powders are not satisfactory at low levels of Pb; the permitted level for instant coffee or tea powders is ≤2 ppm Pb. An AAS method using carbon filament spectroscopy at 217 nm is described. The filament is 1 cm long × 3.2 mm diam., with a notch 2 mm long and 1 mm deep to contain a 5 µl drop of sample (whole apparatus described in detail). In initial experiments, excellent results were obtained with pure aqueous Pb solutions but recoveries from coffee solutions were inadequate. Attempts to improve solution of the coffee by acid or alkali treatments failed, but success was obtained by dissolving the powder in ammonium citrate solution at pH 8.7-9.3. Voltage sequence applied was: 10 s at 0.5 V (drying); interval 45 s; 10 s at 2.0 V (pyrolysis); 60 s interval; 8 V (atomization). The method had a relative SD of 6%, the lowest detection limit was 0.2 ppm Pb in powder, and the time required was 5 min. To improve the sensitivity of the direct analysis method, 5% coffee solutions were mixed with ammonium citrate and KI; the Pb-iodide complex was extracted into methyl isobutyl ketone, concentrated and analysed with voltage sequences of 0.5 V for 5 s, 3 V for 6 s and 8 V. This extended the time for analysis to 1.0-1.5 h, but determined Pb down to 0.02 ppm with no loss of precision (6%). ELC

23

[Studies on coffee and coffee substitutes. XVII. Behaviour of polysaccharide complexes of Robusta coffee during roasting.] Untersuchungen an Kaffee und Kaffee-Ersatz. XVII. Verhalten der Polysaccharid-Komplexe von Robusta-Kaffee beim Rösten.
Asante, M.; Thaler, H.
Zeitschrift für Lebensmittel-Untersuchung und -Forschung **159** (2) 93-96 (1975) [5 ref. De, en] [Inst. für Lebensmittelchemie, Tech. Univ., Braunschweig, Federal Republic of Germany]

2 var. of Coffea robusta (both light-, medium- and dark-roasted) were investigated. The results were similar to those which were published earlier concerning Coffea arabica [FSTA (1969) **1** 12H1255]. One part of the mannan and galactan is destroyed. Another part, which exists originally as a constituent of the holocellulose, is made water-soluble. Of this part, the mannan is found in the complex of water-soluble polysaccharides, the galactan in the complex of galacto-araban. [See FSTA (1974) **6** 4H552 for part XV.] AS

24

Freeze concentration of vegetable juices and infusions. In "Chimie des Cafes Verts, Torrefies et leur Derives" [see FSTA (1976) **8** 3H386]. [Lecture]
Pelt, W. H. J. M. van
pp. 155-162 (1974) [En, fr, es, de] [Grenco BV, PO Box 304, s'Hertogenbosch, Netherlands]

The crystallization section (scraped surface heat exchanger) and separation section (wash column) of a freeze concn. process are described. The process and dewatering costs are given for 4 different freeze concn. plants, i.e. for sugar solution, coffee solution (2 examples) and orange juice solution. It depends on the initial and final concn. as to whether a concn. in more than one stage is economically preferable. Both dewatering capacity and ultimate concn. depend on the liquid food to be concentrated. [See **8** 3H386.] AL

25

[Eventual influence of different manures on chlorogenic acids and caffeine concentrations in coffee beans.] In "Chimie des Cafes Verts, Torrefies et leur Derives" [see FSTA (1976) **8** 3H386]. [Lecture]
Chassevent, F.; Gerwig, S.; Bouharmont, M.
pp. 57-60 (1974) [4 ref. Fr, es, en, de] [Inst. Francais du Cafe et du Cacao, Nogent sur Marne, France]

Experimental plots of coffee bushes in the Cameroons were fertilized with 250 g $(NH_4)_2SO_4$ in March, April, Sept. and Oct. The addition of K^+, PO_4^{3-}, Mg^{2+} and Ca^{2+}, singly or in combination, did not have a significant effect on the total chlorogenic acid (10.9-12.8% of the DM) or caffeine (2.3-2.6% of the DM) contents of the beans. The fertilizer had no obvious effect on the colour of the coffee powder. [See **8** 3H386.] MEG

26

[The present state of coffee chemistry.] Der heutige Stand der Kaffeechemie. In "Chimie des Cafes Verts, Torrefies et leur Derives" [see FSTA (1976) **8** 3H386]. [Lecture]
Streuli, H.
pp. 61-72 (1974) [23 ref. De, fr, es, en] [Organisch-Chem. Inst., Univ., Zurich, Switzerland]

A review is presented of the chemical composition of coffee (Arabica and Robusta), including carbohydrates, lipids, protein, organic acids (including chlorogenic), caffeine and minerals, and covering coffee beans, raw coffee, roasted coffee, aqueous extracts and instant coffees, sugar contents of standard extracts and instant coffees and acid contents of roasted coffee and extracts in relation to degree of extraction. Average data are tabulated. Chemical criteria are not sufficient alone for process control and evaluation of coffee; at present an empirical approach is needed which includes other properties. [See **8** 3H386.] ELC

27

[Analysis of nanotraces in coffee aroma by low temperature gas chromatography.] Nanospurenanalytik an Kaffeearoma durch Tieftemperatur - Gas -Chromatographie. In "Chimie des Cafes Verts, Torrefies et leur Derives" [see FSTA (1976) **8** 3H386]. [Lecture]
Kaiser, R. E.
pp. 73-80 (1974) [6 ref. De, fr, es, en] [Inst. für Chromatographie, D-6702 Bad Dürkheim, Federal Republic of Germany]

Various methods of analysis of coffee products have not yielded a satisfactory correlation with coffee aroma. It is suggested that low temp. gas chromatography used for environmental analyses (e.g. air and water) might be applied to coffee for detection of components present in nano quantities. Other studies have shown that some active substances have pronounced odour effects in concn. $<10^{-10}$%. Methods of direct enrichment, multidimensional separation and specific detection could be applied to quality control of production and formulations of blends; some preliminary examples are given of possible apparatus and procedures. [See **8** 3H386.] ELC

28

[Modern methods for the analysis of chemical celements and their application to biological samples.] Moderne Methoden der Elementanalyse und ihre mögliche Anwendung an Proben biologischen Ursprungs. In "Chimie des Cafes Verts, Torrefies et leur Derives" [see FSTA (1976) **8** 3H386]. [Lecture]
Wänke, H.; Palme, H.; Spettel, B.; Jagoutz, E.
pp. 89-94 (1974) [4 ref. De, fr, es, en] [Max-Planck-Inst. für Chemie, Saarstrasse 23, Mainz, Federal Republic of Germany]

Modern activation techniques using high speed and thermal neutrons give excellent results for analysis of chemical elements, the emitted γ-rays being measured by a high resolution Ge (Li) detector. The analysis does not involve destruction

of the sample, direct irradiation of biological samples is possible without preliminary preparation for the major elements, and the method is rapid. An example of biological application is described for green coffee. Using 14 MeV neutrons it was possible to determine N, O, F, Mg, Al, Si, P, K, Fe, Rb and Sr in green coffee after 10 min irradiation; results (in ppm) are given. A wide range of additional elements could be determined by irradiation for 6 h in a nuclear reactor. [See 8 3H386.] ELC

29

[Gas chromatographic analysis of headspace of defective beans.] In "Chimie des Cafes Verts, Torrefies et leur Derives" [see FSTA (1976) 8 3H386]. [Lecture]
Barel, M.; Challot, F.; Hahn, D.; Vicent, J. C.
pp. 95-101 (1974) [5 ref. Fr, es, en, de] [IFCC, Lab. de Recherches de Nogent-sur-Marne, France]

Defective ('stinker') beans were warmed to 40°C for 45 min in a closed container and samples of the headspace gas were analysed by GLC. Quantitative, but not qualitative, differences were observed between chromatogram patterns from healthy and 'stinker' beans. The increase in methanol and ethanol levels in the 'stinker' beans headspace suggests that their disagreeable odour results from a lactic acid type of fermentation occurring in the beans during storage. The nature of the odour could not be established. [See 8 3H386.] MEG

30

[Instrumental thermal neutron activation analysis of some coffee samples.] In "Chimie des Cafes Verts, Torrefies et leur Derives" [see FSTA (1976) 8 3H386]. [Lecture]
Quijano Rico, M.; Spettel, B.
pp. 102-105 (1974) [8 ref. Es, fr, en, de] [Lab. de Investigaciones sobre la Quimica del Cafe, Fed. Nacional de Cafeteros de Colombia, Bogota, Colombia]

In Colombia, 4 samples of Arabica coffee and 1 commercial sample of freeze-dried coffee extract were analysed by a thermal neutron activation method. The elements measured (in ppm) were: Na (4-820); Cl (50-1150); K (14 500-42 000); Ca (970); Sc (0.004); Cr (0.31); Mn (20-31); Fe (35-140); Co (0.09-0.35); Zn (3-10); Ni (l); As (1.2); Se (0.24); Br (0.1-5); Rb (10-75); Sr (5-20); Sb (0.023-0.03); Cs (0.03-0.8); Ba (1.2-11); La (0.04); Ir (<0.0001); Au (0.001-0.002); and Th (0.005). The values are compared with those for coffee grown in other geographical regions. [See 8 3H386.] MEG

31

[Methods of research in the chemistry of natural substances.] In "Chimie des Cafes Verts, Torrefies et leur Derives" [see FSTA (1976) 8 3H386]. [Lecture]
Reymond, D.
pp. 106-112 (1974) [21 ref. Fr, es, en, de] [Nestle, Lausanne, Switzerland]

A brief account is given of modern analytical techniques (electron spin resonance, TLC, GLC, IR microspectrometry, NMR, MS, spectrofluorimetry) that can be used to study the composition of green and roasted coffee and coffee extracts. Such techniques are valuable for assessing the quality of new strains of coffee plants. [See 8 3H386.] MEG

32

Relationship between some organic compounds of Brazilian green coffee with the quality of the beverage. In "Chimie des Cafes Verts, Torrefies et leur Derives" [see FSTA (1976) 8 3H386]. [Lecture]
Amorim, H. V.; Malavolta, E.; Teixeira, A. A.; Cruz, V. F.; Melo, M.; Guercio, M. A.; Fossa, E.; Breviglieri, O.; Ferrari, S. E.; Silva, D. M.
pp. 113-127 (1974) [63 ref. En, fr, es, de] [Univ. of Sao Paulo, Piracicaba, Sao Paulo, Brazil]

No chemical compound has yet been identified as responsible for the characteristic flavour of coffee. Detailed chemical analyses are presented for 24 samples of Arabica coffee which had been graded into 4 classes (6 samples/class) on the basis of drinking quality. Particular attention was given to components of green coffee likely to yield breakdown products during roasting. Correlation coef. of all chemical estimations and a multiple regression equation for variation of beverage quality in relation to chemical components are presented. Good and poor coffees revealed no significant differences in free carbohydrates, reducing sugars, soluble polysaccharides, total phenols soluble in water or in 80% methanol, and chlorogenic acid isomers. Generally the best coffees had a low chlorogenic acid content, but there were examples of the same content for good and poor beverages. The poorest coffee contained lower hydrolysable phenols and lower NaCl and NaOH soluble proteins (with different electrophoretic patterns between good and poor coffees). It is postulated that a series of enzymic reactions results in hydrolysis of glycosides and oxidation of the free phenols to quinones, which react with amino acids. Statistical analysis indicated that beverage quality is dependent on interactions of several compounds, but not on any single component. [See 8 3H386.] ELC

33

The determination of 3,4-benzpyrene in coffee products. In "Chimie des Cafes Verts, Torrefies et leur Derives" [see FSTA (1976) 8 3H386]. [Lecture]
Strobel, R. G. K.
pp. 128-134 (1974) [21 ref. En, fr, es, de] [Procter & Gamble Co., Cincinnati, Ohio 45247, USA]

An analytical procedure for detn. of 3,4-benzpyrene in various substrates is described. It requires 10-20 g coffee oil or instant coffee, or about 1 l. coffee beverage. The 3,4-benzpyrene present is concentrated by saponification of the oil; isolation of unsaponifiable material is by liquid/liquid extraction and preparative chromatography on acetylated paper. The 3,4-benzpyrene is then eluted from the paper, concentrated and reapplied to acetylated paper,

and after chromatographic migration quantitatively determined by direct fluorometry. The procedure allows detn. of 1×10^{-9} g and qualitative detection of $<1 \times 10^{-10}$ g 3,4-benzpyrene. Quantities found were (ng/g): instant coffee, 0.02-0.06; aqueous infusions of normal roast coffee beans, 0.003; and coffee oil, 0.5. These amounts were considerably lower on average than those reported for wheat, flour, bread, smoked foods, charcoal broiled steak, etc. [See 8 3H386.] AL

34

[Chlorogenic acid in regional coffee varieties of Angola.] In "Chimie des Cafes Verts, Torrefies et leur Derives" [see FSTA (1976) 8 3H386]. [Lecture]
Vilar, H.; Branco Ferreira, L. A.
pp. 135-141 (1974) [18 ref. Fr, es, en, de] [Missao de Estudos Agronomicos do Ultramar, Sitio do Carrascal, Tapada da Ajuda, Lisbon, Portugal]

18 samples of Angolan coffee (3 Arabica and 15 Robusta varieties) were subjected to roasting temp. of 170°, 190°, 210%, 230° and 250°C. The chlorogenic acid (CA) contents of the green and roasted coffees were measured. The green Arabica coffee contained less CA (8.49-8.59% on a DM basis) than the Robusta coffee (10.88-11.98%). Robusta coffees grown in different regions of Angola and at different altitudes had similar CA contents; similarly, the processing treatment (wet or dry) had no significant effect on the CA content. With increasing roasting temp. there was a decrease in CA content. At a roasting temp. of 210°C, there was generally a higher CA content in Robusta coffee treated by the wet process (5.16-7.25%) than in the Arabica coffee (4.45-4.89%) or dry-processed Robusta coffee (3.84-6.46%). [See 8 3H386.] MEG

35

[Isolation of a crystalline bitter product from beans of a Mascarocoffea, Coffea vianneyi.] In "Chimie des Cafes Verts, Torrefies et leur Derives" [see FSTA (1976) 8 3H386]. [Lecture]
Rostolan, J. de; Hammoniere, M.; Poisson, J.
pp. 142-146 (1974) [5 ref. Fr, es, en, de] [Inst. Francais du Cafe et du Cacao-45, bis av. Belle Gabrielle, 94130 Nogent/Marne, France]

Details are given of the isolation of a crystalline, colourless, bitter compound (mascaroside) from C. vianneyi beans. After removal of fat with hexane, the beans were extracted with ethanol and the extract purifiedby treatment with Amberlite IR-120 and IR-45 and then with Sephadex G 10. Mascaroside has an empirical formula $C_{26}H_{36}O_{11}$ and similar spectral characteristics to those of cafamarine (isolated from C. buxifolia), although cafamarine was not detected in the extract. Mascaroside appears to have a heterosidic structure since it gives a hexa-acetyl derivative and yields glucose on acid hydrolysis. [See 8 3H386.] MEG

36

[Composition of Mascarocoffea beans.] In "Chimie des Cafes Verts, Torrefies et leur Derives" [see FSTA (1976) 8 3H386]. [Lecture]
Chassevent, F.; Dalger, G.; Gerwig, S.; Vincent, J. C.
pp. 147-154 (1974) [17 ref. Fr, es, en, de] [Inst. Francais du Cafe et du Cacao, Lab. de Recherches, Nogent/Marne, France]

The total fat, chlorogenic acid and caffeine contents and the fatty acid composition of the beans from 21 var. of Mascarocoffea were compared with those of cultivated coffee var. (Robusta and Arabica). Wide variations in fat content and fatty acid composition were observed, but in general the wild coffee var. contained more palmitic and less linoleic acid than the cultivated var. All the Mascarocoffea var. contained less chlorogenic acids (0.3-1.6% on a DM basis) than the Arabica and Robusta var. (7.1-9.6%); only 1 wild var. (Coffea mauritiana) contained caffeine (45 ppm). [See 8 3H386.] MEG

37

[Effect of the preparation procedure of roasted Colombian coffee samples on the concentration of free radicals as determined by electron paramagnetic resonance.] In "Chimie des Cafes Verts, Torrefies et leur Derives" [see FSTA (1976) 8 3H386]. [Lecture]
Hernandez, P., L. C.; Rodriguez, L., J.; Albis G., E.; Fritsch, G.
pp. 163-171 (1974) [10 ref. Es, fr, en, de] [Univ. Nacional, Bogota, Colombia]

The electron paramagnetic resonance spectra of Colombian coffees were examined after roasting at 220-260°C for 9-18 min in air, $/_2$ or N_2, using the central absorption line corresponding to the presence of free radicals. The free radical concn. increased with the age of the sample and was also affected by the presence of O_2. The relation between concn. and roasting temp. indicated a value of 28 kcal/mol for formation of free radicals. With samples held in a humid atm after roasting, at water contents ≤5% there was little recombination of free radicals, but at >10% there was a marked decrease of free radical concn. [See 8 3H386.] ELC

38

[Study of the broad signal of nuclear magnetic reasonance (proton resonance) in Colombian coffee samples prepared under different conditions.] In "Chimie des Cafes Verts, Torrefies et leur Derives" [see FSTA (1976) 8 3H386]. [Lecture]
Diaz, S., J.; Gomez, S., G.; Felsner, G.; Fritsch, G.
pp. 172-177 (1974) [5 ref. Es, fr, en, de] [Dep. de Fisica, Univ. Nacional, Bogota, Colombia]

The broad signal of NMR in Colombian coffees subjected to different roasting conditions was studied with particular reference to the mobility of water molecules, which may influence storage changes. The state of the water content at different levels was shown to be strongly bound at ≤1%, weakly bound from 1-5%, to have low mobility from 5-10% and to be mobile at >10%. [See 8 3H386.] ELC

39

Chemical and sensory evaluation of the main Brazilian instant coffee. In "Chimie des Cafes Verts, Torrefies et leur Derives" [see FSTA (1976) 8 3H386]. [Lecture]
Angelucci, E.; Yokomizo, Y.; Moraes, R. M. de; Campos, R. B. de; Miya, E. E.; Figueiredo, I. B.
pp. 178-183 (1974) [10 ref. En, fr, es, de] [Inst. de Technologia Alimentos, Campinas, Sao Paulo, Brazil]

16 samples of instant coffee (all Arabica, except for 1 Robusta) from 10 Brazilian manufacturers were analysed for chemical composition. Results were: pH, 4.75-5.55; total acidity, 47.1-87.4 ml NaOH N/100 g; caffeine, 1.63-4.64%; chlorogenic acid, 4.99-8.55%; tannin, 9.72-12.49%; reducing sugars, 5.24-13.67%; total sugars, 10.18-18.97%; pentosans, 1.98-4.25%; ether extract, 0.08-0.63%; total N, 3.13-3.82%; ash, 9.42-13.37%; acid-insoluble ash, 0.11-0.43%; ash alkalinity, 617-1187 mg K_2CO_3/100 g; K, 3.62-5.91%; Ca, 162-301 mg/100 g; Mg, 262-547 mg/100 g; phosphate, 705-1735 mg/100 g; Fe, 1.5-15.3 mg/100 g; and Na, 2.4-759.5 mg/100 g. Some samples showed abnormal figures for caffeine, sugar, phosphate or Na; best sensory results were in general obtained from such samples. A good instant coffee characterization must be based on both chemical and sensory evaluation. [See 8 3H386.] AL

40

[Analysis of freeze-dried coffee after vacuum break with different gases.] In "Chimie des Cafes Verts, Torrefies et leur Derives" [see FSTA (1976) 8 3H386]. [Lecture]
Quijano, R., M.; Diaz, S., J.; Gritsch, G.
pp. 184-187 (1974) [5 ref. Es, fr, en, de] [Lab. de Investigaciones sobre la Quimica del Cafe, Fed. Nacional de Cafeteros de Colombia, Bogota, Colombia]

An experimental apparatus is described in which 2 samples can be freeze-dried simultaneously, then isolated in separate compartments so that the vacuum can be broken by 2 different gases. Small samples (20-40 ml coffee extract) are frozen in a thin layer (2-4 mm) by liquid air, and held for 6-9 h under low vacuum, with sublimination at 40°, 60° or 100°C during 1.5 h. The concn. of free radicals in the freeze-dried samples is determined by electron paramagnetic resonance. Comparisons are reported after breaking the vacuum with N_2, CO_2 or O_2. Initially no differences were found in free radical concn., but when samples were stored increases were found after 10 days. The highest concn. was attained by CO_2 samples, with N_2 samples slightly lower and O_2 samples 10% $<N_2$. With all drying procedures the concn. increased with higher sublimation temp. [See 8 3H386.] ELC

41

[General view of the present development of coffee packing techniques with special regard to flavour retention.] Überblick über den heutigen Stand der Verpackungstechnik für Röstkaffee unter besonderer Berücksichtigung der Aromaerhaltung. In "Chimie des Cafes Verts, Torrefies et leur Derives" [see FSTA (1976) 8 3H386]. [Lecture]
Radtke, R.
pp. 188-198 (1974) [9 ref. De, es, fr, en] [Inst. für Lebensmitteltech. und Verpackung, Tech. Univ., Munich, Federal Republic of Germany]

The flavour of roasted coffee is highly sensitive to O_2 and ground coffee should be consumed within 7-9 days unless it can be specially protected from O_2. For rapid sales the package is required only for portioning and general sales appeal and advertising. For long shelf life e.g. ≥6 months, O_2-free filling, an O_2-tight seal and packaging material of low O_2 permeability are essential. The packaging problems are complicated by the fact that freshly-roasted coffee releases appreciable quantities of CO_2; data are given showing the influence of fineness of grinding and degree of roasting on development of CO_2 pressure. Details are given, with illustrations and diagrams, of package types available for beans and for ground coffee, including vacuum packs, gas packs and special vented packs which release internal gases without admission of external air. [See 8 3H386.] ELC

42

Comparison of changes in roasted coffee beans in pressurized oxygen free vs. atmospheric roasters. In "Chimie des Cafes Verts, Torrefies et leur Derives" [see FSTA (1976) 8 3H386]. [Lecture]
Sivetz, M.
pp. 199-221 (1974) [En, fr, es, de] [3635 NW Elmwood Drive, Corvallis, Oregon 97330, USA]

8 different types of coffee bean roaster developed over the past 15 yr are briefly reviewed, together with patent information and technical illustrations. The Smithern continuous 5 min N_2 gas pressurized coffee roaster and its operation is described when preparing coffee beans originating from 7 different countries. Test equipment, procedures and methods used to compare beverage taste aroma, acidity, soluble solids and bulk density are described. Pressure roasting gives beverages with: 20-50% more soluble solids and more easily extractable solubles; improved taste and aroma especially from Robusta and aged or fermented (Rio) Arabica types; acidity about pH 5.1; 10% increase in bean bulk density; higher residual moisture and/or slightly less solids loss; and a more mottled bean appearance. [See 8 3H386.] AL

43

Effect of process conditions in drying coffee extract and other liquid foods on aroma retention. In "Chimie des Cafes Verts, Torrefies et leur Derives" [see FSTA (1976) 8 3H386]. [Lecture]
Thijssen, H. A. C.
pp. 222-233 (1974) [20 ref. En, fr, es, de] [Univ. of Tech., Eindhoven, Netherlands]

The loss of volatile aromas when drying liquid foods, including coffee extract, is controlled by the rate at which aroma molecules can diffuse to the liquid gas or solid gas interface, and is independent of their relative volatilities. Transfer rate in liquids without internal circulation and in solids is directly

proportional to diffusion coeff. of the migrating molecules. Diffusion coeff. of both water and aroma molecules decrease strongly with decreasing water concn., but diffusion coeff. of aroma molecules (at low concn.) have a much stronger water concn. dependence. Below a critical concn., the system becomes completely impermeable for aromas; this critical moisture content increases with increasing size of the aroma molecule and decreases with temp. High aroma retention results from a steep water concn. gradient at the liquid gas interface and a rapid decrease in water concn. down to the range of complete impermeability for aroma. These effects of process conditions predicted by theory have been experimentally confirmed for spray-, slab-, freeze-, and extractive-drying. [See 8 3H386.] AL

44

Preparation of coffee extracts by continuous extraction. In "Chimie des Cafes Verts, Torrefies et leur Derives" [see FSTA (1976) 8 3H386]. [Lecture]
Kjaergaard, O. G.; Andresen, E.
pp. 234-239 (1974) [En, fr, es, de] [Niro Atomizer Ltd., Copenhagen, Denmark]

2 extraction systems, (i) a semi-continuous percolation battery, and (ii) a continuous extraction system, are described. Advantages of (ii) are that more variables are controlled, it is completely automated and thus requires less labour, has high production capacity and high efficiency of extraction including hydrolysis, water flow is not impeded at high soluble yields, and discharge of spent grounds is trouble free. The performance of (ii) and the effect of variables is described. [See 8 3H386.] AL

45

[Freezing of coffee extract and continuous freeze drying with a plate drier.] Einfrieren von Kaffee-extrakt und kontinuierliche Gefriertrocknung auf dem Tellertrockner. In "Chimie des Cafes Verts, Torrefies et leur Derives" [see FSTA (1976) 8 3H386]. [Lecture]
Orlin, P.
pp. 240-254 (1974) [5 ref. De, fr, es, en] [Krauss Maffei AG, Munich, Federal Republic of Germany]

The principles of freezing and subsequent freeze-drying of coffee extract are outlined. The crystal structure of freeze-dried coffee is discussed and the causes of a too-light or too-dark colour of the basic frozen extract are described. Descriptions and illustrations are given of conventional static dryers (cabinet, cylinder). Advantages of continuous, dynamic plate types are given as improvement in heat transition and some reduction of drying time. Principles of freezing concn. are also discussed, with methods of centrifugal separation of ice crystals. It is considered that a combination of freeze concn. with freeze drying (using an extract of about 40% concn. instead of the usual 25%) will greatly assist rationalization of coffee manufacture. [See 8 3H386.] ELC

46

Processing costs by freeze-drying of coffee. In "Chimie des Cafes Verts, Torrefies et leur Derives" [see FSTA (1976) 8 3H386]. [Lecture]
Poulsen, U.
pp. 255-259 (1974) [En, fr, es, de] [A/S Atlas, Copenhagen, Denmark]

A comparison is made of the basic and running costs, consumption and capacities of 3 coffee freeze-drying plants: a small plant with 2 batch freeze-drying cabinets, a medium-sized plant with 1 Conrad 300 continuous unit, and a larger plant with 2 such units. Large plants are relatively considerably cheaper to operate than small plants. Because of heavy depreciation and interest costs the plant should, for economy, by operated 300 days/yr, and thus must be reliable and of simple design and function. [See 8 3H386.] AL

47

[Evolution of some characteristics of Arabica coffee during experimental storage with five relative humidities and four different temperatures.] In "Chimie des Cafes Verts, Torrefies et leur Derives" [see FSTA (1976) 8 3H386]. [Lecture]
Multon, J. L.; Poisson, J.; Cachagnier, B.; Hahn, D.; Barel, M.; Corte Santos, A. dos.
pp. 268-269, 266, 271-277 (1974) [14 ref. Fr, es, en, de] [INRA, Sta. de Biochimie et Physico-chimie des Cereales, CERDIA, 91305 Massy, France]

Samples of wet processed Arabica coffee from Angola were stored at 20°, 25°, 30° or 35°C and at RH of 60, 75, 85, 90 or 95% in a chamber in which the atmosphere was changed every 6 or 7 min. There was a marked increase in moisture content of the coffee during storage at 75% RH at all temp. The flavour deteriorated as the storage time increased and mould growth (mainly Aspergillus) became established. Bacterial growth decreased as storage temp. and RH increased. No yeasts were detected. Correlations between fungal contamination and water content are discussed. [See 8 3H386.] MEG

48

[Chilled preservation for storage of coffee.] Kühlkonservierung bei der Lagerung von Kaffee. In "Chimie des Cafes Verts, Torrefies et leur Derives" [see FSTA (1976) 8 3H386]. [Lecture]
Bauder, H. J.
pp. 278-283 (1974) [De, fr, es, en] [Sulzer-Escher Wyss GmbH, Lindau/Bodensee, Federal Republic of Germany]

While air-conditioned storage of coffee beans is possible, in practice the cost is usually excessive. Nevertheless it is considered that a system of chilled preservation would be practicable to reduce fluctuations in production lines and would even be applicable to storage of green coffee (in bulk or containers) in humid climates. The simplified system employs a stream of mechanically cooled air which is forced once through and across the surface of the product; the heat extraction capacity of the air is exhausted by the single pass and there is no

recirculation of air or continuous cooling. According to circumstances, a single application or several may by applied. An illustration is given of a simple warehouse equipped with cold air distribution pipes. The re-heating rate after chilling is very low due to the greatly reduced respiration activity. [See 8 3H386.] ELC

49

[Study and construction of an ambient simulator.] In "Chimie des Cafes Verts, Torrefies et leur Derives" [see FSTA (1976) 8 3H386]. [Lecture]
Rilling, J.
pp. 284-289 (1974) [Fr, es, en, de]

The construction of a simple, low cost insulated box (with sides of 50 cm) that can be maintained at a given temp. is described. The purpose of such a box is to simulate climatic conditions found in the Colombian Andes and to study the effects of these conditions on the storage of green and roasted coffees. The performance of the simulator and some optional (expensive) refinements are discussed. [See 8 3H386.] MEG

50

[Chemical purification of the residual waters from wet coffee processing.] In "Chimie des Cafes Verts, Torrefies et leur Derives" [see FSTA (1976) 8 3H386]. [Lecture]
Orozco, R. A.
pp. 290-296 (1974) [Es, fr, en, de] [Productos Quimicos Lumen Limitada, San Jose, Costa Rica]

A procedure is described for purification of waste waters containing mucilage produced during the fermentation stage of wet coffee processing. The waste water is treated with quicklime; this coagulates the suspended solids, which can then be settled out. This process is repeated twice and followed by a final rapid filtration. Basic data were established by preliminary experiments (COD before and after lime treatments and after final filtration, and sedimentation rates of coagulated particles) and then used to design an industrial plant. The filtered water contains the soluble calcium salts of organic acids. The calcium pectate residue from mucilage can be treated with H_2SO_4, which precipitates $CaSO_4$, and the pectic acids can then be recovered. It is preferable to separate most of the mucilage from the berries by mechanical means to reduce capital and operating costs. [See 8 3H386.] ELC

51

Effects of coffee on cardiovascular disease and related risk factors from the medical standpoint. In "Chimie des Cafes Verts, Torrefies et leur Derives" [see FSTA (1976) 8 3H386]. [Lecture]
Heyden, S.
pp. 297-303 (1974) [13 ref. En, fr, es, de] [Dep. of Community Health Sci., Duke Univ. Med. Cent., Durham, N. Carolina 27710, USA]

This review of modern epidemiological and pharmaceutical literature reveals coffee and caffeine as one of the few stimulants without any indications of undesirable side effects on the cardiocascular system, lipid-, glucose- or uric acid metabolism, or the gastro-intestinal or urogenital tracts. The effects of coffee on myocardial infarction, hypertension, cerebrovascular disease, diabetes mellitus, hyperuricemia and gout are discussed. [See 8 3H386.] AL

52

The role of pyrazine compounds in the flavor of coffee. In "Chimie des Cafes Verts, Torrefies et leur Derives" [see FSTA (1976) 8 3H386]. [Lecture]
Odell, G. V.
pp. 312-318 (1974) [23 ref. En, fr, es, de] [Oklahoma Agric. Exp. Sta., Oklahoma State Univ., Stillwater, Oklahoma 74074, USA]

Identification and quantitative estimation of compounds in the basic fraction of roasted coffee volatiles indicate that alkylpyrazines are major contributors to coffee aroma. Pyrazine precursors, e.g. free amino acids and sugars, are converted to active flavour components by pyrolysis during roasting. Factors which affect pyrazine formation are roasting temp., time, precursor concn., and acid or base content of the food. The formation of pyrazines from hydroxy-amino compounds (e.g. serine, threonine, glucosamine) is discussed, and the possible role of dihydropyrazines as flavour components is briefly mentioned. [See 8 3H386.] AL

53

East African mild Arabica coffee quality characteristics associated with green bean coffee volatiles. I. Dimethyl sulphide. In "Chimie des Cafes Verts, Torrefies et leur Derives" [see FSTA (1976) 8 3H386]. [Lecture]
Gibson, A.
pp. 319-324 (1974) [17 ref. En, fr, es, de] [East African Ind. Res. Organisation, PO Box 20650, Nairobi, Kenya]

Samples of 2 hybrid spp. of East African mild Arabica coffee, N.39, which always produces a blueish colour, and KP.162, which lacks this desirable characteristic, were subjected to gas chromatographic head space analysis of the volatile green bean fraction. The major difference between them was the very much higher concn. of dimethyl sulphide in N.39 (1.65-8.20 vs. 1.20 μg-equiv./g toluene), the amount being influenced by different geographic, climatic even processing conditions. There appears to be a strong correlation between dimethyl sulphide concn. at the green bean stage, and the reported acidity of the roast coffee cup liquor. [See also following abstr.] [See 8 3H386.] AL

54

East African mild Arabica coffee quality characteristics associated with green bean coffee volatiles. II. Solai flavour. In "Chimie des Cafes Verts, Torrefies et leur Derives" [see FSTA (1976) 8 3H386]. [Lecture]
Gibson, A.
pp. 325-331 (1974) [En, fr, es, de] [East African

Ind. Res. Organisation, PO Box 30650, Nairobi, Kenya]

Solai flavour is described as being slightly fruits in character or very slightly fermented in flavour. Coffee grown in the Solai region of Kenya has been shown by gas chromatography of head space volatiles to contain abnormally large amounts of ethanol and large amounts of higher alcohols. This high ethanol concn. was shown to be independent of processing method and to be an inherent characteristic of the growing coffee and governed partially by altitude. The method of head space analysis used has unfortunately been shown to be unsatisfactory, as grinding of green coffee causes the loss of a considerable number of volatiles originally present in the green bean tissue. However the primary observations are still valid. [See also preceding abstr.] [See 8 3H386.] AL

55

[Carboxylic acid-hydroxytryptamides and alkali coloration values of raw coffees as guides in assessing the wholesomeness of roasted coffees.]
Carbonsaurehydroxytroptamide und Alkalifarbzahlen in Rohkaffees als analytische Hilfsmittel zur Beurteilung von Röstkaffee-Genusswert und Bekommlichkeit. In "Chimie des Cafes Verts, Torrefies et leur Derives" [see FSTA (1976) 8 3H386]. [Lecture]
Wurziger, J.
pp. 332-343 (1974) [12 ref. De, fr, es, en] [Hygienisches Inst., D-1 Hamburg 36, Federal Republic of Germany]

Some individuals complain of ill-effects following consumption of coffee. The undesirable features are thought to result from chemical changes of an oxidative nature, possibly during harvesting, during roasting of beans, or during transport and distribution. It is considered that an analytical method is needed for detection of suspect raw coffees. Detn. of the carboxylic acid-5-hydroxytryptamide content and the alkali coloration value (which give indications of oxidative changes and peroxide formation) are believed to be suitable methods of control. The procedures are described. [See 8 3H386.] ELC

56

Ent-16-kauren-19-ol from coffee [beans].
Wahlberg, I.; Enzell, C. R.
Phytochemistry **14** (7) 1677 (1975) [9 ref. En] [Swedish Tobacco Co., PO Box 17007, S-10462 Stockholm, Sweden]

57

[Separation of caffeine, theophyllin and theobromine by high pressure liquid chromatography.] Trennung von Coffein, Theophylin und Theobromin mit Hilfe der Hochdruckflüssigkeitschromatographie.
Wildanger, W.
Journal of Chromatography **114** (2) 480-482 (1975) [13 ref. De] [Lehrstuhl für Lebensmittelchem., Tech. Univ., Wunstorfer Strasse 14, D-3000 Hanover, Federal Republic of Germany]

A method for separation of (i) caffeine, (ii) theophyllin and (iii) theobromine by high pressure liquid chromatography (at 120 bar) on Kieselgel LiChrosorb S160 using a dichloromethane/ethanol/water (1872:94:34) elution mixture is described. Separation is conducted at room temp. The concn. of (i), (ii), and (iii) in the eluate may be determined by spectrophtometry at 275 nm. The column may easily be regenerated by in-situ treatment with dioxane. Chromatograms of samples of milk chocolate and coffee chocolate analysed by this method are given. AJDW

58

[Experience with sensory testing.]
Örsi, F.
Elelmezesi Ipar **29** (3) 79-83 (1975) [6 ref. Hu, ru, de, en] [Müszaki Egyetem, Budapest, Hungary]

Details are given of studies (using peach preserves and coffee) on the number of samples which can be sequentially evaluated by taste panellists without adverse effects on the accuracy of evaluation. It was found that the performance of the panellists was reduced after 6 samples had been tested; a rest period is required before further samples are evaluated. As an example, evaluation of fruit juices by alternating teams of panellists is described. IF

59

Process for producing aromatized freeze dried coffee.
Clinton, W. P.; Johnson, J. W.; Meyer, F. W.; Pfluger, R. A.; Jacobs, G. E. (General Foods Corp.)
United States Patent 3 903 312 (1975) [En]

Steam is passed through a column of roasted and ground coffee to distill off aromatics and yield a coffee extract. The extract is concentrated to a solids content of 35-55% and combined with the aromatics to yield a composition which is freeze-dried under conditions to yield an aromatized freeze-dried coffee. IFT

60

Freeze-dried coffee.
Hag AG
British Patent 1 400 283 (1975) [En]

An aqueous coffee extract is partially frozen to form a pumpable crystal slurry to which is added CO_2 or a halogenated fluorinated hydrocarbon gas. The composition is then fully frozen preparatory to freeze-drying. IFT

61

Improvements in or relating to reinforced coffee tablets.
DEJ International Research Co. NV
British Patent 1 401 013 (1975) [En]

Ground roast coffee is mixed with 0.1-5.0% (by wt.) inert fibres such as cotton, hemp or jute before being pelleted to provide a convenient, metered coffee dose. The fibres can be impregnated with additives to improve organoleptic or keeping properties. HBr

62

Improvements in or relating to the agglomeration of water soluble instant foodstuff powder.
DEJ International Research Co. NV
British Patent 1 399 650 (1975) [En]

Instant coffee product is in the form of aromatic coffee oil droplets embedded in solid bridges connecting the primary particles of dried coffee. IFT

63

Water soluble protein and nonprotein components of Brazilian green coffee beans.
Amorim, H. V.; Josephson, R. V.
Journal of Food Science 40 (6) 1179-1184 (1975) [27 ref. En] [Dep. of Microbiol., Ohio State Univ. Columbus, Ohio 43210, USA]

Water-soluble protein and non-protein components of Brazilian Arabica green coffee beans (Soft and Rio) were partially characterized. Water dialysis with membranes of different mol. wt. cut-offs showed a slightly higher % of nondialysable N (protein) over 14 000 mol. wt. in Soft coffee, but slightly higher intermediate sized (between 3500 and 14 000) protein in Rio coffee. Protein for both coffees as estimated by 5% trichloroacetic acid precipitation was lower than by dialysis. Sephadex G-15 and G-25 gel filtration with different elution systems showed good separation of partially characterized small mol. wt. components (254 nm absorbance patterns) and only minor differences between Soft and Rio coffees. Protein components were considerably more heterogeneous by gel isoelectric focusing (IEF), in wide and narrow pH gradients, than by standard alkaline gel electrophoresis. Numerous isoelectric protein species were found in the pH range 5.7-6.3 and a few in the range 4.4-4.7 using non-urea gels. The presence of urea increased the number and resolution of isoelectric protein species. By sodium dodecyl sulphate (SDS) gel electrophoresis, proteins were heterogeneous in mol. wt. with a high proportion in the high mol. wt. range (≥150 000-170 000), but in the presence of urea and 2-mercaptoethanol the proteins were separated primarily into 3 major low mol. wt. species. Sephadex G-150 patterns confirmed the high mol. wt. nature of most proteins in both coffees. No significant differences were found between soft and Rio coffee proteins by IEF, although small differences were found by standard and SDS gel electrophoresis. These differences in protein band patterns cannot give a clear picture as yet on their importance to beverage quality but are deserving of further investigation. IFT

64

Soluble coffee extract.
Ganiaris, N. (Struthers Scientific & International Corp.)
United States Patent 3 908 033 (1975) [En]

Caffeine is solvent extracted from green coffee beans, after which the beans are roasted and extracted with water under heat and pressure to yield an extract which is held under conditions so as to precipitate benzopyrenes and benzofluoranthanes. The liquid extract is then centrifuged to remove solids, and mixed with the caffeine removed in the first step. IFT

65

Fertilizer use and quality with regard to tropical crops. I Stimulants. [Review]
Geus, J. G. de
Stikstof, Dutch Nitrogenous Fertilizer Review No. 17, 22-34 (1974) [34 ref. En]

Factors influencing the quality of tea, tobacco and coffee are discussed with particular reference to the influence of fertilizers. It is concluded that for all 3 crops, a well-balanced fertilizer programme with sufficient N, P and K is of utmost importance not only for an economic yield level, but also for good quality. VJG

66

Manufacturers and roasters see eye to eye: recommendations for better equipment.
Anon.
Tea and Coffee Trade Journal 147 (10) 32, 33, 47 (1975) [En]

Recommendations for improved coffee brewing equipment and equipment services made by the US National Coffee Association are discussed including: tankless heating; location of water lines, terminal blocks and electrical switches in the same easily accessible place on all coffee brewing equipment; location of water filters inside brewing equipment; establishment of 1 filter paper size for the ½ gal and the 8-cup brewer; elimination of sharp edges on all equipment; uses of porcelainized or teflon-coated warmer plates; and standardization of the ½ gal bowl sizes to 60 oz capacity size. RM

67

The alteration of fruit ripening patterns by plant growth regulators and carbohydrates.
Russo, L., Jr.
Dissertation Abstracts International, B 36 (2) 516: Order no. 75-17135 (1975) [En] [Purdue Univ., Lafayette, Indiana, USA]

Investigations were conducted on the ripening of tomatoes, coffee, peppers, and bananas. Selected phenomena which are collectively called fruit ripening (i.e. chlorophyll degradation, carotenoid synthesis, respiratory climacteric, tissue softening, etc.) are observed in naturally ripening fruits, and attempts were made to disrupt these normal ripening processes with chemical ripening regulators such as gibberellic acid and 2-chloroethylphosphonic acid. Ripening responses such as chlorophyll degradation, the respiratory climacteric, and tissue softening were found to be hastened to an equal degree when 2-chloroethylphosphonic acid was applied. While an application of gibberellic acid delayed only chlorophyll degradation and tissue softening, the respiratory climacteric proceeded without delay. Other phases of fruit ripening were also shown to be selectively hastened or delayed, depending upon the treatment. These alterations of ripening

patterns were seen in tissue explants as well as intact fruits. Several varieties of tomatoes were used in this study, and their ripening patterns are compared to pepper, a non-climacteric fruit. AS

68

Flavouring agent.
Winter, M.; Gautschi, F.; Flament, I.; Stoll, M.; Goldman, I. M. (Firmenich & Cie)
United States Patent 3 900 582 (1975) [En]

The flavour of foods and beverages is enhanced by incorporation of methyl substituted pyrone compounds. A particular application is to soluble coffee. IFT

69

[Retail packs. Cartons for bicarbonate of soda, tea and coffee.]
Bulgaria, Komitet po Kachestvoto, Standartizatsiyata i Metrologiyata
Bulgarian Standard **BDS 11282-73**, 3pp. (1973) [Bg]

70

[Coffee and coffee products-vocabulary.]
France, Association Francaise de Normalisation (AFNOR)
French Standard **NF V00-101**, 7pp. (1974) [Fr]

71

[Instant coffee. Determination of moisture content.]
France, Association Francaise de Normalisation (AFNOR)
French Standard **NF V05-221**, 2pp. (1974) [Fr]

A method for detn. of the moisture content of instant coffees (including freeze-dried and decaffeinated instant coffees) is described. A 2-3 g sample of coffee is dried under vacuum (max. pressure 50 mbar) at 70 ± 2°C for 16 h in the presence of a dessicant (e.g. phosphoric anhydride). Moisture content is calculated from sample wt. before and after drying. AJDW

72

[Coffee - determination of caffeine.]
France, Association Francaise de Normalisation (AFNOR)
French Standard **NF V05-251**, 4pp. (1974) [Fr]

The prescribed method for detn. of caffeine in coffee (green coffee, roasted coffee, coffee extracts and decaffeinated products) is described. Caffeine is extracted with dilute NH_4OH; the extract is then cleaned-up by column chromatography on Celite 545 or an equivalent resin, (successively on an alkaline column and on acid column), the caffeine is eluted from the second column with chloroform, and caffeine is determined in the resulting solution by UV spectrophotometry at 276, 246, and 306 nm. AJDW

73

Gas chromatography of nitrogen- and phosphorus-containing compounds. A new, high-sensitivity, variable selectivity detector.
Verga, G. R.; Poy, F.
Journal of Chromatography **116** (1) 17-27 (1976) [10 ref. En] [Carlo Erba Strumentazione, Rodano, Milan, Italy]

A new thermionic detector which shows high sensitivity and marked selectivity towards P- and N-containing molecules and distinguishes between them, is described. Applications mentioned include detn. of pesticide residues in fruit and vegetables, and detn. of caffeine residue in decaffeinated coffee. AL

74

Drip coffee makers using single unit portions seen as panacea to current home consumption slump.
Morse, E. A.
Tea and Coffee Trade Journal **147** (4) 16-17 (1975) [En]

Improvements in the quality of home-brewed coffee obtained by using automatic electric drip coffeemakers and portion packages of coffee are discussed. 2 series of flexible coffee packaging materials with common basic constituents and with the required moisture, vapour and gas barrier properties and physical characteristics necessary during normal handling have been developed: Milseal 32750 and Nealam 62865, made of polyvinylidene chloride-coated, biaxially-oriented polypropylene with a copolymer olefin especially formulated for positive hermetic seals. RM

75

Carbon dioxide generating foodstuff package with polyethyleneimine layer composite plastic film.
Schmidt, H. G.; Stoltzenberg, D.; Wolf, V. (Lever Brothers Co.)
United States Patent 3 840 680 (1974) [En]

This composite plastics film, suitable for packaging CO_2-releasing foodstuffs such as cheese, coffee and dough, consists of one substantially gas-impermeable and one layer permeable to CO_2, with an intermediate layer possessing CO_2 absorbing properties and consisting essentially of polyethyleneimine, the last-named representing 0.3-8 g/m^2 of the composite plastics film. Examples are given relating to packaging Tilsit and Emmental cheese. EJM

76

[New procedure for manufacture of flexible vacuum packs and reduced-pressure inert gas packs.] Neues Verfahren zur Herstellung von flexiblen Vakuumverpackungen und Schutzgaspackungen mit Unterdruck.
Buchner, N.
Kaffee und Tee Markt **25** (19) 4-7 (1975) [De] [Zentrale Vorentwicklung Robert Bosch GmbH, Geschäftsbereich Verpackungsmaschinen,

Waiblingen, Federal Republic of Germany]

The development is described of procedures for packaging ground coffee in reduced-pressure inert gas packs, in vacuum packs after inert gas filling and evacuation, in high-vacuum packs without inert gas, using a modified Transwrap 125 H packaging machine (Robert Bosch GmbH, Geschäftsbereich Hamac-Höller, Federal Republic of Germany), and in various laminated plastics and/or Al/plastics laminates. Packaging procedures and output rates are outlined in relation to fineness of grinding and pack size. The further possibilities are mentioned of innert gas filling and evacuation using a machine making bags from a tube of packaging material. SKK

77

[New vacuum pack for highly sensitive materials.] Neue Vakuumverpackung für hochempfindliche Füllgüter.
Anon.
Kaffee und Tee Markt 25 (18) 17-18 (1975) [De]

The 'Papercan', a rectangular vacuum pack consisting of an inner sealable bag of plastics laminate and an outer carton constructed to form after opening a tightly fitting lid is described and illustrated. The pack, particularly suitable for ground roasted coffee, is produced on a Hesser packaging machine type H-PLDJ 312 fc vacu S 24-3 a. It is considered an improvement on the 'Vacufin' pack currently used on a large scale for coffee packaging. SKK

78

Agglomeration of instant powders.
Bos, J. W. (D.E.J. International Research Co. NV)
United States Patent 3 917 858 (1975) [En]

Aromatized and/or flavour enriched, water soluble, agglomerated powders, particularly coffee powders, are prepared by fusing primary particles to form porous agglomerates and simultaneously and homogeneously dispersing through the powder an appropriate oil e.g. coffee oil. GL

79

Coffee cell suspension cultures; caffeine and chlorogenic acid content.
Buckland, E.; Townsley, P. M.
Canadian Institute of Food Science and Technology Journal 8 (3) 164-165 (1975) [7 ref. En] [Dep. of Food Sci., Univ. of British Columbia, Vancouver, British Columbia, Canada]

The caffeine and chlorogenic acid contents were determined in suspension culture of Coffea arabica, and also, for comparison, in green coffee beans. Max. yield of caffeine from the culture was 0.038% (dry wt. basis), vs. 1.15% for the beans. Max. chlorogenic acid concn. was 1.3%, vs. 6.5% for the beans. JRR

80

[Quantitative determination of carboxylic acid 5-hydroxytryptamides in coffee.] Methode zur quantitativen Bestimmung der Carbonsäure-5-hydroxy-tryptamide im Kaffee.
Culmsee, O.
Deutsche Lebensmittel-Rundschau 71 (12) 425-427 (1975) [5 ref. De, en, fr] [Coffein Compagnie, Postfach 448 130, 2800 Bremen 44, Federal Republic of Germany]

Carboxylic acid 5-hydroxytryptamides (CHT) may be used as an indicator of the concn. of irritant substances present in the waxy coating of coffee beans. A modified version of a TLC method for detn. of CHT is described, based on extraction of the CHT with methanol, clean-up of the extract on an aluminium oxide column, evaporation of the extract (which is then dissolved in benzene/methanol), separation by circular TLC on prepared kieselgel plates (development with benzene/ethyl acetate 4:3), detection of CHT bands by spraying with Gibbs reagent and alkalization with NH_3, re-chromatography with methanol, removal of the outer blue ring from the chromatogram, extraction of CHT with benzyl alcohol, and detn. of CHT concn. by spectrophotometry at 580 nm. AJDW

81

Pectins as potential by-products of coffee waste.
Rao, G. S.
Journal of Coffee Research 5 (1/2) 29-35 (1975) [21 ref. En] [Div. of Plant Physiol., Cent. Coffee Res. Inst., Coffee Res. Sta., 577 117, Karnataka, India]

Coffee mucilage was shown to contain considerable quantities of pectic compounds. Of the 4 coffees analysed, Robusta S.274 had the highest level of pectic compounds in the fresh fruit (1.85%), followed by 0.98% in tree coffee, 0.56% in Arabica S.795 and 0.53% in Devamachy. The pectic content in other plant materials, shown for comparison, ranges from 1.15% in plum, 0.75% in apple residue, 0.53% in raspberry and strawberry, to 0.24% in cherry fruits. On a dry wt. basis Robusta fruit mucilage contained 29.74% pectic compounds, which is comparable to figures quoted for dried peels of pummelo (33.3%), lemon (26.2%), malta (34.66%) and mandarin (32.25%), and is almost twice that in apple residue (15.75%). The IR spectra of Arabica and Robusta pectins are shown, and some properties of coffee pectins are compared with those of apple pectin and shown to be similar. Coffee waste may be a potential source of large quantities of commercial pectin. AL

82

[Thermal and moisture characteristics of coffee.]
Zagorniko, V. A.; Koval'chuk, V. I.; Krivosheev, Yu. I.
Izvestiya Vysshikh Uchebnykh Zavedenii, Pishchevaya Tekhnologiya No. 3, 126-129 (1975) [13 ref. Ru] [Odesskii Inst. Inzhenerov Morskogo Flota, USSR]

Equilibrium between moisture content, bulk density and coeff. of thermal conductivity of whole Robusta coffee grains was studied within the 0-43°C range. Specific density, which was practically independent of temp. within the above range, increased with decreasing moisture. Data on states of equilibrium for moisture in different materials of plant origin are presented. STI

83

Coffee solubilization. Commercial processes and techniques. [Book]
Pintauro, N. D.
Food Technology Review, Noyes Data Corporation No. 28, xii + 256pp. ISBN 0-8155-0598-1 (1975) [En] Park Ridge, New Jersey, USA; Noyes Data Corporation Price $36

This book is based on US patents that deal with commercial processes and techniques for producing instant, soluble coffee. Information is arranged under the following headings: Roasting (pp. 3-34); Extraction (pp. 35-64); Special extraction, filtration and concentration (pp. 65-84); Recovery of aromatic volatiles (pp. 85-109); Dehydration processes (pp. 110-125); Freeze-drying processes (pp. 126-155); Aromatization of soluble coffee powder (pp. 156-176); Agglomeration techniques (pp. 177-209); Decaffeinated soluble coffee (pp. 210-231); and Packaging, special products and processes (pp. 232-247). Company, inventor and patent number indexes are included. VJG

84

[Variation of the caffeine content in the genus Coffea.]
Charrier, A.; Berthaud, J.
Cafe-Cacao-The **19** (4) 251-264 (1975) [31 ref. Fr, de, en, es] [ORSTOM, 24 rue Bayard, 75008 Paris, France]

The caffeine contents of cultivated and wild coffee spp. in the Madagascar, Ivory Coast and Cameroon collections were determined in green coffee powders by the Kum-Tatt method, as modified by Ornano et al. [Cafe Cacao The (1967) **11** (1) 14-30]. Very low concn. were confirmed by TLC. The following results (%, DM basis) were obtained: Coffea arabica, 0.58-1.89; C. canephora, 1.16-4.0; C. eugenoides, 0.23-0.51; Liberio excelsoides, 0.52-1.80; and C. stenophylla, 1.7. Mascarocoffea spp., viz. Paracoffea ebracteolata (African), Para. humbertii (Malagasy) and Para. bengalensis (Asiatic), contained no caffeine. The hereditary transmission of the caffeine concn., environmental effects and possibilities of breeding for low caffeine concn. are discussed. RM

85

[Studies on coffee and coffee substitutes. XVI. Polysaccharides in extracts of a Robusta coffee.]
Untersuchungen an Kaffee und Kaffee-Ersatz. XVI. Polysaccharide in Extrakten eines Robusta-Kaffees.
Asante, M.; Thaler, H.
Chemie Mikrobiologie Technologie der Lebensmittel **4** (4) 110-116 (1975) [3 ref. De, en, fr] [Inst. für Lebensmittelchemie, Tech. Univ., Braunschweig, Federal Republic of Germany]

Extracts with extraction yields of 39.5, 45.2, 48.7 and 58.0% were obtained from roasted Angola-Robusta coffee using a commercial installation, and a 38.8% extract simulating home preparation was obtained by scalding and repeated boiling up of finely ground Robusta coffee defatted with light petroleum. Analysis was by methods described in earlier publications of this series. Sugars obtained after extract hydrolysis were determined using an enzymic method, the procedure for separation of arabinose from galactose being described in detail. Values for total contents of the galactan, mannan, glucan and araban polysaccharides and their contents in the highly polymerized and less polymerized fractions are tabulated as extract % and as coffee %. Proportions of galactan and mannan (the 2 main polysaccharides) increased progressively with increase in degree of extraction; those of glucan and araban changed much less. Values for total polysaccharides in 39.5 and 58.0% extracts were respectively (as % coffee): galactan 6.03 and 9.75, mannan 5.49 and 9.21, glucan 0.25 and 0.48, and araban 0.98 and 1.76. [See FSTA (1974) **6** 4H552 for part XV.] SKK

86

The composition of the fatty acids in coffee oil and coffee wax.
Folstar, P.; Pilnik, W.; Heus, J. G. de; Plas, H. C. van der
Lebensmittel-Wissenschaft + Technologie **8** (6) 286-288 (1975) [10 ref. En] [Lab. of Food Chem., Agric. Univ., De Dreyen 12, Wageningen, Netherlands]

The composition of the fatty acids in the wax of the surface layer of green coffee beans and in wax-free coffee oil was studied. Wax-free oil contained mainly palmitic, stearic, oleic, and linoleic acids. In this oil there was a higher proportion of unsaturated acids in the triglycerides than in the diterpene esters. Like most vegetable oils, the unsaturated acids showed a preference for the C-2 position in triglycerides. The triglycerides, and particularly the diterpene esters, of the wax of the surface layer of beans consisted of a high % of arachidic, behenic and lignoceric acids. AS

87

[Granulated beverage bases.]
Watanabe Seika Co. Ltd.
Japanese Patent 5 033 144 (1975) [Ja]

Granular beverage bases are produced by mixing a beverage extract, e.g. natural juice, coffee or black tea, with a water and glucose solution. Additional anhydrous glucose is added and the product dried and granulated. IFT

88

Flavoring agent.
Winter, M.; Gautschi, F.; Flament, I.; Stoll, M.; Goldman, I. M. (Firmenich & Cie)
United States Patent 3 917 871 (1975) [En]

Flavour of soluble coffee materials is altered by the incorporation of benzofuran carbonyl compounds, e.g. benzofuran-2-aldehyde, 2-acetyl-benzofuran or 7-methyl-benzofuran-2-aldehyde. IFT

89

Flavoring agent.
Winter, M.; Gautschi, F.; Flament, I.; Stoll, M.; Goldman, I. M. (Firmenich & Cie)
United States Patent 3 917 872 (1975) [En]

Flavour of soluble coffee materials is altered by the incorporation of pyrazine carbonyl compounds. IFT

90

Stndard for: Coffed, instant.
Canada, Canadin Governmemt Spdcifications Board
Canadin Governmemt Spdcifibations Board Stndard **32-GP-113c**, 3pp. (1973) [En] [Deo. of Supoly & Seqvices, 88 Metcalfe Street, Otsawa, Canada]

This standard, which supersedes **32-GP-113b** (1969), applies to the powdered water-soluble solids derived from fresh, roasted and ground coffee that, when reconstituted with freshly boiled water, produces a palatable beverage. The coffee can be of 2 types, viz. regular or decaffeinated (≤0.25% caffeine) and of 4 classes: spray-dried (max. moisture content 3.5%), spray-dried agglomerate (≤4.25% moisture), freeze-dried (≤2.5% moisture), and their mixtures (% of each to be specified). The standard also covers general and detailed requirements, preparation for delivery, and inspection. AL

91

Standard for: Coffee, roasted and ground.
Canada, Canadian Government Specifications Board
Canadian Government Specifications Board Standard **32-GP-110e**, 3pp. (1974) [En] [Dep. of Supply & Services, 88 Metcalfe Street, Ottawa, Canada]

This standard supersedes **32-GP-110d** (1967) and covers 2 types of coffee, viz. regular and decaffeinated (≤0.07% caffeine), and 2 classes, viz. all-purpose grind (drip or urn) and fine grind (vacuum). It covers general and detailed requirements (caffeine content, seive analysis and cup quality), preparation for delivery, and inspection. Vacuum/gas packaged cans of 1, 3 and 5 lb size should have min. vacuum of 28, 27 and 26 in Hg at time of sealing and residual O_2 of 10, 35 and 60 mg, respectively. Flexible packaging shall have <2% residual O_2 at time of packaging and be capable of limiting O_2 content to <3% for 3 months. AL

92

[Process and apparatus for the extraction of volatile substances.]
Weber, G. (Societe des Produits Nestle SA)
Swiss Patent 563 792 (1975) [Fr]

Extraction of volatile substances from particulate material, e.g. coffee and tea, using simplified apparatus, consists of allowing the material to fall under gravity and meet a gaseous flow, preferably water vapour, which is flowing up and which carries the volatile substances with it. The pressure depends on the nature of the gaseous fluid and the temp. at which the process is being carried out. W&Co

93

[Product promotion through packaging. Protection, advertisement, sale: protective function and sales function as exemplified by vacuum packaging of coffee.] Produktvermittlung durch die Packung. Schützen, werben, verkaufen: die Schutzfunktion und die Verkaufsfunktion am Beispiel der Vakuumverpackung für Kaffee.
Glaser, A.
Kaffee und Tee Markt **25** (22) 6-8 (1975) [5 ref. De]

The Food Technology and Packaging Institute of the Munich Technical University has put forward the following recommendations for package for roast coffee: for short turnover time, the package should retain aroma, be fairly impermeable to water vapour, the inner wrapping should be fat-resistant, impervious to fat and free from heavy metals, and the package should be re-closable; for long turnover time, the package should additionally be impervious to O_2 water vapour, show satisfactory mechanical strength so that vacuum-packaged bags of ground roasted coffee remain gas-tight during transport and handling, and for insufficiently de-gassed roasted coffee must either be resistant to some overpressure and deformation, or must allow compensation of internal pressure either by being made from material slightly permeable to gas or by insorporating a one-way valve. The purpose of these recommendations, their implementation in practice and effects on presentation and sales of coffee in existing and new packages are discussed. SKK

94

[Sealed carton containing grounds of freshly roasted coffee or of a coffee substitute.]
Bouvet, J.; Spreter, V.; Goiffon, T. (**Switzerland**, Battelle Memorial Institute)
Swiss Patent 561 644 (1975) [Fr]

A thin Al container for coffee, which is designed to be ruptured to allow the passage of hot water, is divided into 2 compartments by a permeable partition, preferably filter paper. One compartment contains the coffee or coffee substitute and the other compartment contains C black. The C black absorbs at least a portion of the volatile products produced by the freshly roasted coffee. The compartment containing C black may be above, at the sides of, or in the middle of the coffee compartment. W&Co

95

[Determination of foreign admixtures, coats and stems in ground roasted coffee.]
Lopez, F. C.
Revista do Instituto Adolfo Lutz **34**, 29-34 (1974) [Pt, en] [Inst. Adolfo Lutz, Sao Paulo, Brazil]

Coats and steams, roasted maize, sugar, soil, sand, and spent coffee are among the main ground roasted coffee adulterants in Brazil. A method for detection and estimation of the adulterants, involving $CHCl_3$ treatment of the sample and removal of coffee powder by sifting, is described in detail. The Adolfo Lutz Institute examined during 1969-1973 approx. 3000 samples of ground roasted coffee; % rejected each yr increased from 0.21 to 12.1 during the period. It is pointed out that until 1971, the Brazilian Coffee Institute supplied all coffee used by the manufacturers (at 75% below the market price), but that since then it has supplied only 60% of the requirement (at 60% below the market price). SKK

96

[Problem of CO_2 desorption of roasted coffee from the viewpoint of new developments in packaging materials.] Das Problem der CO_2-Desorption von Röstkaffee unter dem Gesichtspunkt einer neue Packstoffentwicklung.
Radtke, R.; Heiss, R.
Kaffee und Tee Markt **25** (17) 7-14 (1975) [4 ref. De] [Inst. für Lebensmitteltech. und Verpackung, Munich, Federal Republic of Germany]

A sample of untreated and a sample of decaffeinated coffee from a batch a Arabica beans and corresponding samples from a different batch were roasted in the laboratory under conditions simulating commercial practice, and release of CO_2 formed by pyrolysis was studied in whole beans immediately after cooling or in ground coffee immediately after cooling and milling. Desorption curves for whole beans and for coarsely and finely ground coffee as well as microscope and electron microscope pictures of roasted beans are presented. Vol. of CO_2 released by the 2 batches of (i) non-decaffeinated whole roasted beans was 380 and 400 cm^3/100 g at 760 mm Hg and that released by the corresponding (ii) decaffeinated beans was 450 and 400 cm^3; values for ground beans were of a similar order. The porosities (void vol./bean vol.) measured on 10-g samples were 0.38 and 0.47 for (i) and 0.49 and 0.47 for (ii). Desorption lasted approx. 1500-2500 h (400-1000 h for ground beans). For packaging 250-500 g portions of roasted coffee, gas-tight packs of plastics material with release valve, or use of CO_2-absorbing plastics [see Federal German Patent Specification (1972) No. 2 115 211] is recommended. SKK

97

[Candle filters and plate-and-frame filters for diatomite filtration.] Filtration mit Kieselgurkerzen- und Kieselgurschichtenfiltern. [Lecture]
Narziss, L.
Brauwelt **115** (50) 1676, 1678-1679 (1975) [De, en, es] [Lehrstuhl für Tech. der Brauerei I, Weihenstephan, Federal Republic of Germany]

The characteristics, design and operation of plate-and-frame kieselguhr filters and 2 types of kieselguhr candle filter for beer are discussed. Advantages and disadvantages of candle filters and plate-and-frame filters are considered, and use of combined kieselguhr filter/centrifuge and and kieselguhr filter/sheet filter systems is discussed. TUB-IGB

98

[Experiences with a Sigrist type beer turbidity meter.]
Debreczeny, I.
Söripar **22** (4) 134-136 (1975) [Hu]

Good results were obtained in a Hungarian brewery over a 6-month period with a beer turbidity meter of the Sigrist type (Vulgascot, Vienna) which was attached as a control device to a siliceous earth filter without automatic control of the filtering process. IF

99

A comparison of the unsaponifiable lipids isolated from coffee cell cultures and from green coffee beans.
Voort, F. van de; Townsley, P. M.
Canadian Institute of Food Science and Technology Journal **8** (4) 199-201 (1975) [4 ref. En, fr] [Dep. of Food Sci., Fac. of Agric. Sci., Univ. of British Columbia, Vancouver V6T 1W5, British Columbia, Canada]

Coffee cell cultures of Coffea arabica were shown to contain the 3 sterols, β-sitosterol, stigmasterol and campesterol as the major components of the unsaponifiable fraction of the cell lipid. Two diterpenoid alcohols, cafestol and kahweol, which are major components of coffee

bean oil unsaponifiables, were shown also to be present in the plant cell cultures. The presence of the 2 diterpenoid alcohols in coffee cell suspension cultures would suggest that the coffee cell cultures maintain their ability to synthesize compound unique to the parent coffee plant. AS

100

[Analysis of wastes during production of instant coffee.]
Vol'per, I. M.; Solov'eva, T. Ya.; Il'enko-Petrovskaya, T. N.; Lazarev, E. N.
Konservnaya i Ovoshchesushil'naya Promyshlennost' No. 9, 36-37 (1975) [Ru]

To produce 1 t of soluble coffee 3249 t of green coffee are needed, yielding after extraction approx. 8 t of sludge with 76.0-76.2% water content. The liquid part of the sludge may easily be separated by pressing, and may serve for extraction of following raw material batches as it still contains some of the extractive materials. By means of TLC and paper chromatography 6.2% chlorogenic acid and 7% caffeic acid were isolated from this press liquid after dehydration; the coffee extract contained 7.8 and 7% of these constituents, respectively. The fat of the sludge was dark brown and possessed the odour of roasted coffee and a bitter flavour. The dehydrated sludge contained 13.4-16.5% fat, the liquid sludge approx. 4% fat. The sludge fat had an acid number of 15.0, an iodine number of 56, and a peroxide value of 0.180. The properties of sludge fat are compared with those of fat from green and roast coffees. STI

101

Effects of roasting temperatures and gamma irradiation on the content of chlorogenic acid, caffeic acid and soluble carbohydrates of coffee.
Deshpande, S. N.; Aguilar, A. A.
International Journal of Applied Radiation and Isotopes **26** (11) 656-661 (1975) [15 ref. En] [Dep. of Chem., Univ. of Puerto Rico, Mayaguez, Puerto Rico 00708, USA]

2 var. of Puerto Rican coffee were irradiated at 0.5, 1.0 and 12 Mrad and roasted at 200° and 250°C. Aqueous extracts of ground beans were analysed for chlorogenic and caffeic acids at 324 and 360 nm, respectively, and for total carbohydrate and N. Roasted and irradiated samples were treated with basic lead acetate prior to colorimetry, to eliminate interfering substances. Roasting reduced the chlorogenic and caffeic acids and carbohydrate concn., irradiation increased the soluble carbohydrate concn. without affecting the chlorogenic and caffeic acids, suggesting that radiation caused degradation of the acid-polysaccharide complexes liberating soluble sugars. No changes in the total N content or in free amino acids were observed, precluding the possibility of formation of Maillard type condensation products. The characteristic flavour of roast coffee was attributed to the sugar esters of the chlorogenic and caffeic acids. RM

102

[The need for alteration of the permitted extraction limit in the manufacture of coffee extracts.] Über die Notwendigkeit der Fixierung einer veränderten Extraktionsgrenze bei der Herstellung von Kaffee-Extrakt.
Geerds, F.
Deutsche Lebensmittel-Rundschau **72** (2) 54-60 (1976) [De] [Schulberg 1, 6256 Villmar-Langhecke, Federal Republic of Germany]

Aspects considered in this paper include: consumer expectations; the legal situation in the Federal Republic of Germany; the lack of evidence for any health hazard from coffees exceeding the current extraction limit; analytical problems of detn. of the degree of extraction used in coffee extract manufacture; trends in manufacture and trade in coffee extracts; the current state of discussion of legal measures in the Federal Republic of Germany and in the EEC; and likely consequences of a change in the permitted extraction limit. AJDW

103

The design and development of the TPI Produce Inspection Sieve.
Golob, P.; Nichols, W.
Report, Tropical Products Institute L42, iv + 10pp. ISBN 0-85954-039-1 (1975) [En, fr, es] Price £0.30 [Tropical Products Inst., 56/62 Gray's Inn Road, London WC1X 8LU, UK]

The sieve, developed, designed and constructed by the Tropical Products Institute, was used successfully for recovery of dust and insects from coffee beans in sacks. Optimum conditions for the operation of the sieve included a gap of 1.5 cm between the commodity hopper and the sieve mesh and a cranking rate of 70 rev/min; an average 60 kg sack was sieved in 2 min 20 s. With coffee beans a sieve of 0.1 in (2.54 mm) aperture could be successfully used for all types of beans but would be less successful in recovery of last instar Ephestia cautella larvae. This is not considered of any consequence for commercial applications. The tests described provide an assessment of the capacity of the sieve for inspecting coffee beans. It is probable that it would perform equally well with other commodities. AS

104

White coffee concentrate.
Unilever Ltd.
British Patent 1 415 844 (1975) [En]

A coffee concentrate with preferably <55% TS is made by adding a coffee extract in liquid or powder form to milk (preferably evaporated) at 10°C, and the mixture is homogenized at 65°C, pasteurized, and filled into containers whilst still hot (at about 75°C). According to an example the concentrate contains 13% liquid coffee extract (66% TS), 26% of 40% fat cream, 13% dried skim-milk, and water to 100%; it may contain up to 25% sgugar. The concentrate is pourable and bacteriologically stable and provides a pleasant drink on dilution with water. FL

105

Machine for the preparation of a beverage, more particularly a coffee beverage.
Wiederkehr, J. (HGZ-Aktiengesellschaft)
British Patent 1 416 355 (1975) [En]

A dispensing machine for preparing a beverage, e.g. white coffee with cream, by dissolving the ingredients with hot water is covered. FL

106

Food additives. Lactylic esters of fatty acids.
United States of America, Food & Drug Administration
Federal Register **40** (299, Nov. 26) 54 777 (1975) [En] [Washington, DC, USA]

The use of lactylic esters of fatty acids under the Federal Food, Drug, and Cosmetic Act is expanded to include any edible vegetable fat-H_2O emulsion used as a substitute for milk or cream in beverage coffee so as to include all physical forms such as dry, frozen, and liquid coffee whiteners. CAS

107

[Shipping containers. Corrugated board case for sodium bicarbonate, tea and coffee.]
Bulgaria, Komitet po Kachestvoto, Standartizatsiyata i Metrologiyata
Bulgarian Standard **BDS 12003-74**, 2pp. (1974) [Bg]

108

Metallized film improves appearance and shelf life for institutional ground coffee packages.
Peters, J. W.
Food Product Development **9** (7) 60, 62 (1975) [En]

Elkin Coffee, Inc., of Bow, New Hampshire, packages ground coffee in 1-lb pillow pouches (plus several small sizes 2-3 oz), made from a polyester/polyethylene laminate onto which an Al coating has been deposited. The preparation and properties of this metallized film are briefly discussed. In a shipping test, the RP 109 (metallized film) was compared with a cello/poly/foil/poly laminate. O_2 transmission rate of the foil laminate was 13 times higher than the metallized film. In order to evaluate cold weather durability of RP 109, coffee pouches were packed 64 in a bulk shipper and held for 3 days at 0°F. They were tumbled 12 times end over end. All packages were found to be acceptable when checked for leaks. When shippers were dropped twice from a height of 4 ft, 92% of the pouches were acceptable. The packaged product has improved shelf-life, appearance and machinability. VJG

109

Flavor chemistry of tea, coffee, cocoa.
Reymond, D.
Abstracts of Papers, American Chemical Society **171** (Centennial), AGFD 23 (1976) [En] [Nestle Products Tech. Assistance Co. Ltd., CP 1009, 1001 Lausanne, Switzerland]

110

On the analysis of oil in green coffee beans.
Folstar, P.; Pilnik, W.; Heus, J. G. de; Plas, H. C. van der
Mitteilungen aus dem Gebiete der Lebensmitteluntersuchung und Hygiene **66** (4) 502-506 (1975) [6 ref. En, de, fr] [Agric. Univ., Wageningen, Netherlands]

Green coffee beans (Colombian C. arabica) were coarsely ground (CG) with an 'Olland' disc crusher and extracted with petroleum ether either directly or after acid treatment. A portion of the CG beans was ground more finely in a 'Retsch' ultracentrifugal mill equipped with an 0.50 mm sieve. Direct extraction of the oil from the finely ground (FG) beans was complete in 6 h, whereas under similar conditions only 50% extraction of the CG beans was obtained. The oil from the CG beans had a higher % unsaponifiable matter and differed in its fatty acid composition from that given by the oil from the FG beans. From comparisons of the % oil extracted directly from several sieve fractions (0.15-0.85 mm) with that determined after acid treatment of these fractions it is concluded that the sieve fraction with particle size 0.15-0.42 mm was most suitable for total coffee oil analysis. It is not necessary to preheat the grind before extraction. MEG

111

[Effects of combinations of coffee bean extracts of high or low polyphenol oxidase activity on dihydroxyphenylalanine.]
Oliveira, J. C. de; Silva, D. M.; Amorim, H. V.; Teixeira, A. A.
Cientifica **3** (2) 332-336 (1975) [8 ref. Pt, en] [Dep. de Fitotecnia, Fac. de Med. Vet. e Agron. 'Prof. Antonio Ruete', Jaboticabal, Brazil]

Effect of extracts from coffee beans yielding a beverage of poor drinking quality on the polyphenoloxidase of extracts of good drinking quality was studied. Enzymes were extracted from beans by grinding to a fine powder with phosphate solution at low temp., filtration and centrifugation to yield a concn. of enzyme in the supernatant; enzyme activity was determined by action on dihydroxyphenylalanine. Results are given for 'good' and 'poor' coffees and for mixtures of the 2 types. An apparent synergistic effect was observed with enzyme activities of mixtures greater than the sum of the individual coffee values. It is concluded that drinking quality does not depend solely on enzyme activity, and although such activity differs widely between the best and worst coffees it is difficult to suggest values for intermediate qualities. ELC

112

Over-fermented coffee beans ('stinkers'): a method for their detection and elimination. [Lecture]

Gibson, A.; Butty, M.
Kenya Coffee **40** (475) 319-330 (1975) [En]
Extensive trials showed that most coffee off-flavours were due to hidden and/or visible over-fermented beans. The characteristic fluorescence pattern emitted allowed such beans to be distinguished from sound, clean, green beans. A commercial sorting machine developed in cooperation with Gunson's Sortex, London, allowed removal of over-fermented beans with 100% efficiency. Except for taints caused by external contamination, all known off-flavours were removed in extensive tests on a wide var. of raw material. 4 types of fluorescence pattern found are shown. The response of off-flavours to fluorescence sorting and subsequent changes in quality grading are tabulated (e.g. removal of 8.2% reject beans increased grading by 3 classes, from 8 to 5). Best results were obtained by removing the contaminating stinkers immediately after normal milling. The fluorescence technique also allows evaluation of overall coffee quality, the age of green coffee and processing and storage conditions. A description of the automatic coffee sorting equipment is appended. RM

113

[Coffee storage and processing. Expert service in a modern port]. Kaffeelagerung und -Bearbeitung. Qualifizierte Dienstleistung in einem modernen Hafen.
Anon.
Kaffee und Tee Markt **25** (24) 3-6 (1975) [De]
The different stages of raw coffee unloading, cleaning, mixing, bagging and storage used at the Kaffee-Lagerei GmbH in Hamburg (Federal Republic of Germany) are described and illustrated. SKK

114

Food engineering and coffee. [Lecture]
Clarke, R. J.
Chemistry and Industry No. 8, 362-365 (1976) [En] [General Foods Ltd., Banbury, UK]
Types of green coffee in general use, green coffee processing (wet and dry), green coffee roasting, coffee grinding, packaging and brewing, and instant coffee manufacture are briefly described. AL

115

Coffee extraction process.
Katz, S. N. (General Foods Corp.)
United States Patent 3 928 636 (1975) [En]
Soluble coffee solids yields from percolated roasted or ground coffee are increased by contacting an aqueous extraction liquid with the spent stage extraction column at <120°F. GL

116

[Steam treatment of coffee beans.]
Untersuchungen über die Vorgänge beim Dämpfen von Kaffeebohnen.
Gal, S.; Windemann, P.; Baumgartner, E.
Chimia **30** (2) 68-71 (1976) [6 ref. De, en] [Inst. für Lebensmittelchemie, Univ. Bern, Muesmattstrasse 19, CH-3012, Bern, Switzerland]
The reactions occurring during steam treatment of green coffee beans were investigated. 3-Methoxy-4-hydroxystyrene (3,4-MHS) could be detected in the condensate as well as in the treated beans. Benzaldehyde, phenylacetaldehyde, isovaleric acid, furfural and caffeine were identified in the condensed steam. The 3,4-MHS is formed from the feruloylquinic acid present in raw coffee. A method for quantitative detn. of 3,4-MHS was developed (limit of detection in green coffee 2 ppm, relative SD 7% at concn. <20 ppm). AS

117

Flavoring agent.
Winter, M.; Gautschi, F.; Flament, I. F.; Stoll, M.; Goldman, I. M. (Firmenich & Cie)
United States Patent 3 922 366 (1975) [En]
Flavour of soluble coffee materials is enhanced by the incorporation of a compound with the general formulae R_1-CH_2COCH_2S-R_2, where R_1 is H_2 or methyl and R_2 is methyl or furfuryl. Specific compounds included in the above formula are furfuryl thioacetone, 1-methylthio-butan-2-one and methylthioacetone. IFT

118

[Quantitative determination of pyrazines in foods.]
Carballido, A.; Villanua, L.; Valdehita, M. T.; Robisco, M. A.
Anales de Bromatologia **26** (4) 391-419 (1974) [106 ref. Es, en] [Escuela de Bromatologia, Univ. Complutense, Madrid, Spain]
The formation and importance of pyrazines in roasted foods is reviewed by means of an extensive literature survey. The method of Daniel et al. [Mitteilungen aus dem Gebiete der Lebensmitteluntersuchung und Hygiene (1967) **60** (5) 397-403] was modified to allow extraction and detn. of pyrazines as dimethyl-2,6-pyrazine from 1 g of material in 2 h, and used to determine pyrazines in 58 samples of coffee, coffee substitutes and dried nuts. Tabulated data showed the following results (μg/g): green coffee beans, 3.28-31.38; lightly toasted coffee beans, 213.56-309.10; commercial roasted coffee beans, 222.92-334.86; soluble coffee, 209.34-373.25; soluble decaffeinated coffee, 184.99-334.86; coffee substitutes, 75.40-275.38; fresh dried nuts, 12.18-27.67; and roasted dried nuts, 29.04-50.11. RM

119

[Process for heat treatment and processing of flowable substances, particularly cocoa, coffee and malt.] Verfahren zur Wärme und Stoffbehandlung von rieselfähigen Produkten, insbesondere von Kaffee, Kakao und Malz.
Gimborn, C. H. von (Probat-Werke von Gimborn & Co. KG)
German Federal Republic Patent Application 2 424 142 (1975) [De]

In the drying and roasting of products, e.g. coffee, cocoa and malt, heat energy is conserved and the moisture content of the air is regulated by utilizing off-gases mixted with fresh air. The mixture is heated and preferably treated with a catalyst for oxidation of odorous substances. W&Co

120

[Ochratoxin A in coffee.] Ochratoxin A im Kaffee.
Gallaz, L.; Stalder, R.
Chemie Mikrobiologie Technologie der Lebensmittel 4 (5) 147-149 (1976) [9 ref. De, en, fr] [Societe d'Assistance Tech. pour Produits Nestle SA, Lab. Biol., Orbe, Switzerland]

Aspergillus ochraceus, a natural contaminant of green coffee, produced 40 parts/billion of ochratoxin A when grown on coffee under laboratory conditions. During roasting, 80-90% of the ochratoxin was destroyed. AS

121

Process for producing a foamed coffee extract.
Isaac, M. Y.; Pyves, R. R.; Colborne, G. S. (General Foods Ltd.)
Canadian Patent 984 216 (1976) [En]

A two-fluid nozzle is used to incorporate a gas into an aqueous coffee extract to produce a foamed extract which is dried to produce a low density soluble coffee powder. IFT

122

Grinder gas fixation.
Katz, S. N. (General Foods Corp.)
United States Patent 3 939 291 (1976) [En]

Coffee grinder gas is fixed in a glyceride by contacting 0.5-6 g condensed grinder gas frost and 1 g glyceride in a pressure vessel at a temp. greater than the critical temp. of liquid CO_2. The pressure vessel is vented to slowly release the pressure and prevent a drop in temp. to below the critical level with subsequent formation of liquid CO_2. GL

123

Percolation process.
Katz, S. N. (General Foods Corp.)
United States Patent 3 944 677 (1976) [En]

A countercurrent coffee percolation process employs extraction columns which reduce the ground coffee particle size in the direction of flow of the aqueous extraction liquid. IFT

124

Recirculation of water combined with land treatment as a solution to the problem of river pollution from coffee factories.
Kenya, Director of Water Department
Kenya Coffee 41 (479) 64-70 (1976) [6 ref. En]

The Kenya Ministry of Water Development requirements for prevention of pollution by the coffee industry are presented. The water allocation has been changed to 5000 g/t coffee processed, and nil returnable. Instructions are given for factories operating the recirculation system on pulping, hulling and pre-grading, fermentation, final washing and grading, and soak water. The relevant rules of the Water Act are reproduced. RM

125

Flavoring agent.
Winter, M.; Goldman, I. M.; Gautschi, F.; Flament, I.; Stoll, M. (Firmenich & Cie)
United States Patent 3 940 502 (1976) [En]

The flavour of soluble coffee materials is modified by the incorporation of specified furfuryl ethers e.g. furfuryl methyl ether, furfuryl ethyl ether, furfuryl phenyl ether, difurfuryl ether, and mixtures thereof. IFT

126

Standard for: coffee, roasted and ground.
Canada, Canadian Government Specifications Board
Canadian Government Specifications Board Standard **32-GP-110e**, Amendment No. 1, 1p. (1975) [En] [88 Metcalfe Street, Ottawa, Ontario, Canada K1A OS5]

This amendment to **32-GP-110e** (1974) [see FSTA (1976) **8** 5U265] deals with preparation for delivery and inspection for residual O_2. AL

127

Fres-co System: all in one packaging.
Accorsi, R.
Tea and Coffee Trade Journal **148** (4) 26 (1976) [En] [Goglio Luigi SpA, Milan, Italy]

A flexible packaging system is described which allows coffee to be packed under vacuum directly after roasting and grinding in a polypropylene/Al foil/polyethylene laminate with a special patented one-way polyethylene valve, to enable the coffee to breathe during storage. The process ensures excellent flavour and aroma during >6 months storage. RM

128

Spectrophotometric determination of theobromine in T. cacao, C. acuminata and C. arabica.
Somorin, O.
Journal of Food Science **41** (2) 458-460 (1976) [16 ref. En] [Chem. Dep., Univ. of Lagos, Akoka, Yaba, Lagos, Nigeria]

A number of different techniques are reported in the literature for the extraction and purification of

theobromine as well as quantitative methods following purification. This research note reports a procedure offering considerable time saving for the determination of theobromine in Theobroma cacao, Cola acuminata and Coffea arabica. The procedure incorporates the Wadsworth extraction technique, gradient elution partition chromatography and quantitative estimation of theobromine spectrophotometrically. IFT

129

Quantitative determination of caffeine in cola-type drinks by thin-layer chromatography and densitometry.
Sengupta, P.; Mondal, A.; Sen, A. R.; Roy, B. R.
International Flavours and Food Additives **6** (6) 340 (1975) [15 ref. En] [Central Food Lab., Calcutta 16, India]

Multiple routine detn. of caffeine is necessary in a laboratory engaged in the regular analysis of tea, coffee, cola drinks and carbonated water. The extraction procedure is a modified Polzella method [FSTA (1969) 1 11H1112]. Plates of silica gel G are developed with ethyl acetate-methanol-acetic acid (8+1+1). Known amounts of standard solution (5, 10, 15, 20, 25 µl) along with drink samples, are spotted 2 cm from one end on separate TLC plates. The plates are developed in the ascending mode, allowing the solvent to rise 15 cm. Plates are removed, sprayed with acidified I solution (5%) when brown spots (R_f 0.41) appear immediately. The optical density of the spots is immediately measured with a densitometer. The peak areas are plotted against the concn. of caffeine and the caffeine concn. of the sample solution calculated from the graph. The extraction and dilution procedures are simple, require no special instrument or constant attention and can be performed within a few h. Recovery of caffeine is of the order of 99%. The method gives reliable results with other food materials containing caffeine, e.g. tea and coffee. VJG

130

[Method for extraction of stimulants from raw coffee beans.] Verfahren zur Extraktion von Reizstoffen aus Rohkaffee.
Gal, S.; Jenny, E. (Haco AG)
Swiss Patent 568 719 (1975) [De]

The carboxylic acid of 5-hydroxy-tryptamides, believed to be the main cause of undesirable side-effects of coffee consumption, is extracted from raw coffee beans without simultaneously reducing the caffeine content by using a caffeine-containing solvent. The beans may subsequently be rinsed with caffeine-free solvent; they are freed from residual solvent by steaming and then dried to their original water content. The solvent, preferably dichloromethane, dichloroethane, trichloromethane or trichloroethylene, contains preferably 1% caffeine. Extraction is preferably carried out at elevated temp., e.g. 60°C, its effectiveness being improved by a pre-treatment with steam and possibly water to effect a 30-40% swelling of the beans. Lowering of the carboxylic acid-5-hydroxy-tryptamide content to 200-300 mg/kg roasted coffee beans can be achieved. The treated beans have a light colour and a pleasant, mild aroma. W&Co

131

[Evaluation of raw and roasted coffee beans by coffee oils.] Über Kaffeeöle zur Beurteilung von grünen und gerösteten Kaffeebohnen. [Lecture]
Wurziger, J.
Fette, Seifen, Anstrichmittel **78** (4) 172-176 (1976) [8 ref. De, en] [Chem. und Lebensmitteluntersuchungsanstalt, Hygienisches Inst., Gorch-Fock-Wall 15-17, 2000 Hamburg 36, Federal Republic of Germany]

The composition of coffee oils in green and roasted arabica and robusta coffees is discussed with the aid of tabulated data from the literature, and the detection of robusta coffee in mixtures with arabica in raw and roasted, whole and powdered beans by means of colour reactions of the coffee oil is described. For direct detection of robusta coffee, a petroleum ether extract of the beans is separated by TLC on silica gel G by petroleum ether:ether:glacial acetic acid (100:5:2), and exposed to HCl fumes; a pink-red spot develops even after long storage of the coffee. The reaction is very sensitive and results can be obtained from fragments of beans. RM

132

[Cadmium and lead in brewed coffee.]
Stenström, T.; Vahter, M.
Var Föda **27** (3) 150-156 (1975) [6 ref. Sv, en] [Omgivningshygieniska Avdelning, Naturvardsverk, S-104 01 Stockholm, Sweden]

Uptake of Cd and Pb by water during boiling was studied with 20 types of domestic coffee-making machine on sale in Sweden. The water used was of pH 8.3, and had initial Pb and Cd concn. of 0.6-0.8 µg/l. and 0.06 µg/l. respectively. Samples of one machine gave very high Cd concn. (≤99 µg/l.) in the boiled water; after daily use for 4 wk, it still gave a Cd concn. of approx. 40 µg/l. Another type gave very high Pb concn. (≤260 µg/l.). Sources of heavy metal contamination are discussed, with special reference to solder and Pb-containing brass. The potential health hazard from water containing Pb and Cd concn. of this order of magnitude is discussed. Losses of Cd from the water during infusion and filtration of tea and coffee were studied. 19-38% of the Cd in the water was present in the filtered coffee; 70-91% of the Cd in the water was present in the tea infusion. AJDW

133

The measurement of feruloylquinic acids and caffeoylquinic acids in coffee beans. Development of the technique and its preliminary application to green coffee beans.
Clifford, M. N.; Wight, J.
Journal of the Science of Food and Agriculture **27** (1) 73-84 (1976) [42 ref. En] [Dep. of Food Sci. & Nutr., Univ. of Strathclyde, Glasgow, UK]

Total chlorogenic acids were estimated in 70% 2-propanol extracts of green coffee beans by adding 10 ml of 0.25% aqueous sodium metaperiodate to 1 ml of extract and measuring the colour developed at 406 nm. Caffeic and caffeoylquinic acids were measured specifically with a sodium molybdate reagent [see Swain & Hillis Journal of the Science of Food and Agriculture (1959) **10**, 63]. The successive use of the metaperiodate and molybdate reagents enabled ferulyolquinic acids to be measured by difference. The accuracy of the method was investigated using synthetic mixtures of caffeic and ferulic acids and of caffeoylquinic and feruloylquinic acids; a regression equation was obtained which permitted low levels of ferulic or feruloylquinic acids to be determined. The ranges of values obtained for Arabica and Robusta green coffee beans respectively were (as % of DM): total chlorogenic acids, 5.65-6.48 and 8.39-9.47; caffeoylquinic acids, 5.62-6.26 and 7.71-8.43; and feruloylquinic acids, 0-0.33 and 0.54-1.20. MEG

134

Coffee classifications.
Munene, S. G.
Kenya Coffee **40** (476/477) 347-349 (1975) [En]

Coffee gradings as laid down by the liquoring department of the Kenya Coffee Boards are summarized including bean, roast and cup quality for 6 commercial quality grades, 4 grades of rejects and 3 clean Buni classifications. RM

135

[Process for producing low stimulant roasted coffee.] Verfahren zur Herstellung von röstreizstoffarmen Röst- und Extraktkaffee.
Mohr, E. **(Germany, Federal Republic of,** Inge Institut für Genussmittelforschung GmbH)
German Federal Republic Patent Application 2 429 589 (1976) [De]

Unwanted stimulants, e.g. pyridine, pyridine derivatives, furfurol and phenols, are removed from roasted coffee using an organic solvent with a bp <30°C, preferably formic acid ethyl ester, at 20-5°C below the bp of the solvent. After extraction, the remaining solvent is removed from the roasted coffee using vacuum distillation at 50°C. W&Co

136

[Swiss food handbook. Methods for examination and evaluation of foodstuffs and items of utility. Vol. II. Ed. 5. 11th Supplement (1973).]
Schweizerisches Lebensmittelbuch. Methoden für die Untersuchung und Beurteilungen von Lebensmitteln und Gebrauchsgegenständen. Zweiter Band. Fünfte Auflage. 11. Lieferung (1973). [Book]
Switzerland, Schweizerische Lebensmittelbuchkommission; **Switzerland,** Eidgenössisches Gesundheitsamt
58pp. (1973) [De] Berne, Switzerland; Drucksachen- und Materialzentrale

This 11th supplement of the official handbook contains the following 2 sections (with indexes): Baking yeast (section 17, 7pp.); and Coffee and coffee substitutes (section 35, 51pp.). [See preceding abstr. for supplement 10, FSTA (1976) **8** 3A168 for supplement 12, and (1976) **8** 8A390 for supplement 13.] JA

137

Flexible pouches: trend of the future?
Anon.
Tea and Coffee Trade Journal **148** (4) 20-21, 46-47 (1976) [En] [Flexible Packaging Div., St. Regis Paper Co., USA]

A consumer survey in Dallas, Texas, revealed that 76% of 278 survey participants liked coffee packaged in portion-size (2.5 oz) flexible paper pouches, and 80% would buy it if it were no more expensive than comparable canned coffee. 69.4% said pouches were easier to use than cans. Alure, a metallized polyester laminated to polyethylene, offers the appearance of foil combined with excellent gas and moisture vapour transmission protection (MVTR 0.02 G/100 in^2/24 h at 100°F and 90% RH) and O_2 permeability (0.06 ml/100 in^2/24 h); the sealing temp. is 400°F. In conjunction with gas flushing Alure allows 6 months shelf life with no loss of freshness. RM

138

[Coffee and cocoa production.]
Japan, Agency of Industrial Science & Technology
Japanese Patent 5 037 742 (1975) [Ja]

Manufacture of coffee, cocoa and chocolate products employs enzymic treatment with laccase to promote oxidation of caffeic acid. IFT

139

[Interspecific hybrids of Coffea canephora Pierre and C. eugenoides Moore.]
Louarn, J.
Cafe-Cacao-The **20** (1) 33-52 (1976) [30 ref. Fr, de, en, es] [Orstrom, BP 434, Man Ivory Coast]

Several first and second generation (F_1 and F_2) hybrids of C. canephora and C. eugenoides were studied with a view to improving coffee produced at low altitude. In F_1 hybrids, >66% caracoli seeds (single-seeded fruits attributable to chromosomal aberration) were obtained. Caffeine contents of F_1 seeds were 1.2-1.5%, intermediate between those of the parents (1.9-2.3 and 0.2-0.4%, respectively); caffeine contents of F_2 back-crosses with C. canephora were 1.5-2.1%. Very small-scale cup tests indicated less body and strength than in C. canephora, the brew resembling that of C. eugenoides. RM

140

[Effect of ethylene on the maturation of coffee berries.]
Monaco, L. C.; Söndahl, M. R.
Pesquisa Agropecuaria Brasileira, Agronomia **9** (10) 135-137 (1974) [7 ref. Pt, en] [Inst. Agron., Cx. Postal 28, Campinas, Sao Paulo, Brazil]

A study was made of the possibility of using 2-chloroethylphosphonic acid (Ethrel) to accelerate maturation of coffee berries. 50 ml solutions containing 500, 1000 or 2000 ppm active ingredient were applied at 4 growth stages to cv. Mundo Novo, Catuai Amarelo and Catuai Vermelho. A single application of 500 ppm was sufficient to accelerate maturation, but results indicated that Ethrel should be applied when the endosperm is well developed. [From En summ.] JA

141

Steam volatile aroma constituents of roasted coffee: neutral fraction.
Vitzthum, O. G.; Werkhoff, P.
Zeitschrift für Lebensmittel-Untersuchung und - Forschung **160** (3) 277-291 (1976) [52 ref. En, de] [Wissenschaftliche Abteilung, HAG AG, Hagstrasse, D-2800 Bremen, Federal Republic of Germany]

The volatile components of roasted coffee, isolated by normal-pressure steam distillation, were separated into basic and neutral fractions. The neutral fraction was analysed on a UCON HB 5100 glass capillary column (200 m × 0.31 mm inner diam.) coupled to a low-resolution mass spectrometer. 120 compounds were identified, of which 26 had not been previously reported in coffee aroma. Identification of the structures of the newly identified compounds was accomplished by comparison of their mass spectra with reference spectra. GLC retention times were used to confirm identifications. The new compounds identified for the first time in roasted coffee include 15 furans, 6 pyrroles, 3 thiophenes, and 2 ketones. Of the 15 furans, several methylvinylfurans, dimethylvinylfurans and alkenylfurans, which had not been previously found in roasted foodstuffs, are of particular interest. MS data of the newly identified substances are tabulated. Fragmentation patterns of N-acetyl-2-methylpyrrole, N-furfuryl-2-methylpyrrole, 2-vinyl-3-methylfuran and 2-vinyl-3,5-dimethylfuran are discussed. Comments are made on possible formation patterns and precursors in green coffee beans. [See also FSTA (1975) **7** 11H1682.] AS

142

How can we prevent coffee detection? [Lecture]
Whitelaw, A. J.
Tea and Coffee Trade Journal **148** (3) 18-19, 50-52 (1976) [En]

The increasing detention of green coffee shipments by FDA inspectors is discussed with the aid of data from the 1974 and 1975 seasons. Tables show that the % insect infestation and damage was fairly stable at 74-76%, rodent damage at 4-5%, but major increases were noted in mould damage (from 3 to 8%) and foreign substance contamination (from 1 to 5%). The producing areas with greatest increase in detention were Africa, Indonesia and New Guinea. The "shipping factor" (time, temp. and humidity during shipment) may be involved. The costs involved in reconditioning insect-infested green coffee are analysed, and basic principles of prevention outlined. The control of pesticide residues is briefly discussed. RM

143

Continuous freeze-drying plants for instant coffee.
Soerensen, K.
Tea and Coffee Trade Journal **148** (4) 24-25 (1976) [En] [A/S Atlas, Copenhagen, Denmark]

The Atlas continuous freeze-drying plant, type Courad (continuous radiation), is described. It uses simple, straight trays with a shallow product layer and radiant heat from horizontal heating plates grouped in temp. zones. The plant is built for integrated, internal and external control of the whole tray transport system and automatic control of all auxiliary systems. It is available in 4 sizes (Courad models 200, 300, 400 and 450) and annual capacity (300 days) of the 400 model is 2 640 000 lb freeze-dried coffee. RM

144

[Studies on coffee and coffee substitutes. XVIII. Relationship between the quantity and composition of a highly polymerized glactomannan, the coffee species and the degree of roasting.]
Untersuchungen an Kaffee und Kaffee-Ersatz. XVIII. Abhängigkeit der Menge und Zusammensetzung eines hochpolymeren Galaktomannans von der Art und dem Röstgrad des Kaffees.
Ara, V.; Thaler, H.
Zeitschrift für Lebensmittel-Untersuchung und - Forschung **161** (2) 143-150 (1976) [11 ref. De, en] [Inst. für Lebensmittelchem., Tech. Univ., Fasanenstr. 3, D-3300 Brunswick, Federal Republic of Germany]

2 samples of Coffea arabica ((i) Santos and (ii) Colombia) and 2 samples of C. canephora var. robusta from (iii) the Ivory Coast and (iv) Angola were each roasted lightly, normally or strongly and contents of galactomannan (G) in extracts were determined and expressed as % extract, roasted coffee or raw coffee. G contents increased with increase in roasting severity, extreme values for (i)-(iv) being respectively (% extract): 6.8-12.7, 7.7-11.6, 6.6-11.0 and 6.9-11.3. Corresponding % of mannan, galactan and glucan in G were respectively in (i)-(iv): mannan, 69.1-74.5, 68.2-86.0, 50-72.7 and 44.9-67.7; galactan, 7.3-4.3, 22.8-2.5, 28.9-7.3 and 29.0-5.1; and glucan, 0-0, 1.7-0.3, 1.2-1.8 and 0-0.2. [See FSTA (1976) **8** 3H457 for part XVII.] SKK

145

Determination of polycyclic aromatic hydrocarbons: technique and application to coffee oils.
Bracco, U.
***Nestle Research News* 1974/75**, 83-93 (1976) [26 ref. En]
See FSTA (1974) **6** 7H1106 for Fr text.

146

A quick biochemical test for assessment of coffee quality.
Gopal, N. H.; Venkataramanan, D.; Ratna, N. G. N.
***Indian Coffee* 40** (1) 29-33 (1976) [26 ref. En] [Cent. Coffee Res. Inst., Coffee Res. Sta. 577 117, Chickmalagur District, Karnataka, India]
A quick biochemical test to determine the presence of free aldehyde compounds with Schriff's reagent is described. Differences in free aldehyde compounds as indicated by the % of beans with deep and pale purple colour in the different quality ('fine', 'good', 'fair average', 'falling off', and 'poor') were significant at the 5% level except between 'good' and 'fair average'. The validity of the test was confirmed by comparing the results of biochemical and beverage quality tests of 6 samples of arabica coffee of unknown quality. The % of raw beans with deep purple colour in the 5 quality grades was ≥92, 89-91, 87-88, 75-86 and ≤24, respectively. RM

147

Coffee roasting system.
Sivetz, M.
United States Patent 3 964 175 (1976) [En]
Coffee beans are levitated as a dense, uniformly recirculated mass by a stream of air at ≤530°F. Heat transfer which is primarily by convection and secondarily by conduction from bean to bean continues until the desired roast is obtained. The system may employ batch type or continuous roast apparatus. GL

148

Method of extracting roasted coffee.
Lee, W. F.; Jeffery, W. J.; Pyres, R. R.; Isaac, M. Y. (General Foods Ltd.)
United States Patent 3 965 269 (1976) [En]
Coffee extract is produced by split extraction percolation of roasted and ground coffee wherein a percolator set is divided into an atmospheric section and an autoclave section. IFT

149

Freeze-dried coffee extract.
Elerath, B. E. (General Foods Corp.)
United States Patent 3 961 424 (1976) [En]
Liquid coffee extract is mixed in a liquid refrigerant at temp. between 15°F and the ice point to permit the growth of large ice crystal structures. The mixture is then cooled below the eutectic temp. after which the frozen coffee extract is separated from the refrigerant and freeze-dried. IFT

150

[Quantitative variations in acetaldehyde in ground coffee after different times of roasting at 220°C.]
Figueiredo, I. B.
***Coletanea do Instituto de Tecnologia de Alimentos* 6** (2) 361-377 (1975) [16 ref. Pt, en]
Variations in the different volatile components formed after the roasting of coffee beans were studied. Beans were roasted at 220°C for 3, 4, 5, 6, 8, 10, 12 and 14 min. They were then ground and incubated at 60°C (for 2 h) in small bottles with self-sealing caps, so that samples for GLC could be taken directly from the headspace with a hypodermic syringe. Chromatographic analysis showed the presence of 12 peaks of which the 6th was acetaldehyde. This showed the greatest variation after roasting, attaining a max. concn. after 8 min, which then gradually decreased with longer roasting. Other volatile components also attained their max. concn. in ground coffee after 8 min roasting at 220°C. AS

151

[Contribution to the enzymic study of the green coffee bean. I. Tyrosinase and lacase.]
Rotenberg, B.; Iachan, A.
***Revista Brasileira de Tecnologia* 3** (3) 155-159 (1972) [11 ref. Pt, en] [Inst. Nacional de Tecnologia, Rio de Janeiro, GB, Brazil]
In order to study the enzymes (mainly with phenolase activity) of the green coffee bean, several substrates and reaction conditions were used. "Tyrosinase" (catechol oxidase 1.10.3.1.) and "lacase" (p-diphenol oxidase 1.10.3.2.) activities were determined, using DOPA (DL-3,4-dihydroxyphenylalanine), hydroquinone and catechol as substrates. It was shown that distinct "varieties" of coffee beans (Mole, Riado, Duro and Rio) reacted differently with the above-mentioned substrates, as did the slopes of the lines obtained when enzymic activities (absorbances) were plotted against reaction time in order to characterize them. DOPA proved to be the best of the substrates studied for differentiating the several "varieties". AS

152

[Coliforms and faecal coliforms as contamination indicators. I. Presence in soils, water and vegetables.]
Freitas Leitao, M. F. de; Romeu, A. P.; Cruz, R. R.
***Revista Brasileira de Tecnologia* 4** (3/4) 207-211 (1973) [10 ref. Pt, en] [Inst. de Tecnologia de Alimentos, Caixa Postal 139, Campinas, SP, Brazil]
Within the study, 106 coliforms were isolated from fruit (unspecified) and vegetables (lettuce) and 66 from coffee beans. Non-faecal forms (Enterobacter-Klebsiella) predominated in both

cases. On the basis of the Most Probable Number technique, 70% of the lettuce contained <30 faecal coliforms/g and 67% contained >11 000 total coliforms/g. HBr

153

The stability of instantized skimmed milk powder to hot coffee.
Sweetsur, A. W. M.
Journal of the Society of Dairy Technology **29** (3) 157-160 (1976) [12 ref. En] [Hannah Res. Inst., Ayr, Scotland KA6 5HL, UK]

The stability of 14 instantized milk powders to hot coffee was determined by the 'coffee test' in which 5 g powder were added to 100 ml freshly prepared 1.3% coffee solution (pH 4.78) at 85°C. After 10 s, the solution was stirred for 30 rev with a spoon and then centrifuged at 300 × g for 10 min. The amount of sediment (coffee precipitate) was found to be correlated positively with casein number, wettability time and solubility index (r = +0.81, 0.75 and 0.72 respectively) and negatively with max. and min. coagulation times at 140°C and dispersibility (r = -0.69, -0.48 and -0.88 respectively) of the milk powders. Results suggest that the more unstable powders had received too severe heat treatment during manufacture. MEG

154

Enhancement of coffee flavor.
Parliment, T. H.; Clinton, W. P.; Scarpellino, R.; Soukup, R. J.; Epstein, M. F. (General Foods Corp.)
United States Patent 3 962 321 (1976) [En]

The coffee flavour of foods is enhanced by the addition of a mixture of 2-nonenal, and/or 2-nonenol, and particularly derivatives thereof, and a pyridyl compound. In the 2 position, the pyridyl compound is substituted with -X-R, where X is oxygen or sulphur and R is a lower alkyl. Positions 3, 5 and 6 are substituted with hydrogen or alkyl; at least one of the substitutes in the 3, 5 or 6 position is an alkyl of 2-12 carbons. GL

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